

# RAILROAD GAZETTE

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## EDITORIAL ANNOUNCEMENTS.

**THE BRITISH AND EASTERN CONTINENTS** edition of the Railroad Gazette is published each Friday at Queen Anne's Chambers, Westminster, London. It contains selected reading pages from the Railroad Gazette, together with additional British and foreign matter, and is issued under the name Railway Gazette.

**CONTRIBUTIONS.**—Subscribers and others will materially assist in making our news accurate and complete if they will send early information of events which take place under their observation. Discussions of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired.

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FRIDAY, AUGUST 30, 1907.

In our issue of Aug. 2 we called attention to the first of the bulletins issued by the committee on car efficiency of the American Railway Association, showing surpluses and shortages of revenue freight cars on July 10 on all the principal roads. Statistical bulletin No. 2 has now appeared, continuing the previous study in the effort to show the causes which affect the efficiency of a freight car. Mr. Hale, chairman of the committee, has done a remarkable piece of work in collecting the figures thus presented. His report covers 163 roads, and gives for each one, except in rare cases where the information was partially not available, a complete history of its car balance and performance for the six months ended Dec. 31, 1906. Four measures are used to determine car efficiency: per cent. of cars in shop, average miles per car per day, per cent. of loaded mileage and average loading of cars. Thus, the average per cent. of cars in shop for all roads reporting is 5.48. Mr. Hale points out that it is customary on many roads to make reductions from time to time in shop expenses, and though this may not occur often when there is a local shortage, it is frequent practice when there is a general shortage. His statistical findings show very clearly the actual cost of this, since a decrease of but one-half of 1 per cent. in the number of cars in shop would be equivalent to an increase of 9,490 cars in service, with an approximate value of \$9,500,000. One of the roads listed showed a percentage of cars in shop as high as 30.69. The average number of cars on line per freight engine owned is given as 82, but individual averages run as high as 231, excluding one company not fairly comparable. The average daily earnings of all cars on the line is \$2.51, and the average per car owned is \$2.59. In one instance the individual average of all cars on the line was \$11.42, and it is reported as low as 88 cents in ordinary service, but it does not fall below \$1.07 on any railroad of importance. Earnings of from four to six dollars a day occur frequently in the compilation. The common assumption, therefore, that freight cars on a busy line earn five dollars a day is a conservative one. The average mileage per car per day is 24.2, including, as in the previous figures, 11 Canadian and Mexican lines, and 71 per cent. of the mileage is loaded. The average ton mileage per car mile is 13.6, and the average ton mileage per loaded car mile, 19.4 per car per day, the average ton mileage is 329. The average daily car journey is lowest in the southern states (18.3 miles), not in the New England states (18.5 miles) as might have been expected. The Union Pacific reports a daily car journey of 48.8 miles in Montana, Wyoming, Nebraska and the Dakotas, while one of the largest lines in the South can only get 14.6 miles.

## THE PRESENT COST OF MONEY.

In accounting for the present depreciation in the quoted values of railroad and industrial shares and securities it is often mentioned and it is apparent that a general cause is the world-wide demand for money, aggravated in the United States by a hostile governmental and legislative attitude. It is interesting and perhaps worth while to look a little farther and see if this unprecedented demand for capital among all the great nations is comparatively permanent or passing.

In the period of from two to five years ago the transportation and other industries in this country were at high tide, as they still are. They needed and easily got, at reasonable interest rates, all the money needed for rapidly increased facilities, and this money came from England, Germany, Holland, and for the first time in large amounts from France, as well as from our own people. In that period the industrial situation on the Continent was none too good. In spots it was bad. German manufacturing was only beginning to show signs of improvement under the artificial stimulus of cash subsidies and a rebate of freight rates on exported products. The government contribution to the German maker of exported locomotives is about ten per cent., not far from \$1,500 per locomotive. Generally speaking, the capital requirements in Germany and the other European manufacturing nations was less than normal, because business was not very good. In England business was distinctly bad. "Armies of the unemployed" were organizing and marching to an extent that was mildly threatening. Old schemes, many of them fantastic, for making work for working people without enough to live on, were revived, discussed and sometimes tried. Money earning small return in Europe flowed in billions to investment in American railroads and, less generally, in industrials.

Looking back for thirty-five years there is further and quite uniform evidence for an inference. During our periods of most acute depression following the years 1873 and 1893, as well as during our other severe but less keenly felt reaction, the conditions in Europe were quite different, and sometimes were reversed. For a generation our seasons of highest prosperity have not been coincident with foreign prosperity. For the first time in recent history we meet long continuing prosperity in the four great manufacturing nations. They are in apposition. More and more capital expenditures in all these countries have at the same time become highly profitable, both as a means of earning more and in order to produce cheaper. When it pays to borrow capital money for great under-

takings at from six to seven per cent., and when Fortune, perforce, smiles alike in three languages, the resulting effect on the interest rate is inevitable.

And the awakening; the certain effect on the prices of shares, notes and first-class bonds? The price of bonds is affected the least. The holdings of restricted institutions, trustees and estates are the last to be changed, but the market is narrowed and almost choked. The device of two- and three-year notes of great corporations, to tide over the times of too widespread prosperity, has been useful, until the coming of the 7 per cent. rate; then the conservative officer halts.

As we look back at it now, the prices of dividend paying stocks have been too slow to yield to the pressure. Up to about a year ago, strong stocks may be said to have sold at a price to yield from 4 to 4½ per cent. Speaking generally, good stocks are now quoted on a 6½ to 7 per cent. basis. With a prevailing interest rate increased from 4 to 5½ per cent.; from 4½ to 6, and from 5 to 7 per cent., varying with the time and the security, there comes quite late a depreciation in the prices of good stocks of from 17 to 33 per cent.

The object of this reference is not at all to consider the investment or speculative value of corporate securities at present prices; it is simply to point out to officers of railroad and manufacturing companies that this present depreciation in security prices, this increased interest rate, means to them not only added difficulty in getting new capital, but also an increased operating cost, or, rather, more deduction from net earnings. They buy materials and hire labor and money. The cost of material has increased less than is ordinarily counted. For example, the cost of locomotives per unit of horse-power developed is less now than it was ten years ago. The cost of labor has increased quite 20 per cent., rated in cost per hour, but its efficiency has decreased largely—by a percentage which no one is competent to estimate. The added cost of money comes last, and it is evidently as much as 25 per cent.

#### THE SALE OF THE CHICAGO & ALTON.

Even while Wall Street is in the depths, there comes news of a new railroad merger. The Toledo, St. Louis & Western, a small road with one single line connecting Detroit and Toledo on the east with St. Louis on the west, adds to its 450 miles of line and \$4,200,000 of gross earnings the 970 miles and \$11,600,000 gross earnings of the Chicago & Alton, a far stronger and better equipped property. This has been brought about through its acquisition of \$20,800,000 of the total of about \$40,000,000 capital stock of the Chicago & Alton. This controlling block of Alton stock was sold by the Rock Island Company and interests identified with it. The Rock Island made its investment in Chicago & Alton in 1903 after the Union Pacific has acquired over \$10,000,000 Chicago & Alton preferred stock. The Rock Island's object was to prevent the road from falling under entire control of the Union Pacific. In this the Rock Island interests were successful, for they secured more than enough stock to give them actual control of the property. Despite this fact, an agreement was made with the Union Pacific by which the Alton was to be held under a system of alternating control, the Union Pacific managing the property one year and the Rock Island the next. This agreement, however, was abrogated last June. The Rock Island Company controls the Chicago & Eastern Illinois, which parallels the Alton between Chicago and St. Louis, and the St. Louis, Kansas City & Colorado, which parallels the Alton between St. Louis and Kansas City. The Rock Island's control of the Alton therefore drew unfavorable criticism from the Interstate Commerce Commission. The Rock Island interests realized that they would not be allowed by the United States Government to keep possession of the Chicago & Alton, and therefore were glad to sell the property to the Toledo, St. Louis & Western at a loss said to be about \$4,500,000 on the original investment.

The Chicago & Alton stock purchased by the Toledo, St. Louis & Western is to be paid for by that company by issuing its collateral trust bonds secured by the Alton stock. Four per cent. bonds are to be issued against the preferred stock at par and 2 per cent. bonds against the common stock at 35. The rate on these latter bonds is to be raised to 4 per cent. at the end of five years. Figuring the preferred stock at par and the common stock at 35, the par value of these collateral securities which the Toledo, St. Louis & Western is to issue will be \$11,227,000, of which \$6,380,000, issued against the preferred stock, will be paying 4 per cent. and \$4,847,000, issued against the common stock, will be paying 2 per cent. This makes an average rate of 3.1 per cent. which the

Clover Leaf will be paying on the par value of its Alton-collateral bonds during the first five years of their existence. It is obvious that in the present state of the market collateral trust bonds of a road like the Toledo, St. Louis & Western, which until five months ago had never declared a dividend and which occupies by no means a commanding position among the railroads of the country, secured by stock of the Chicago & Alton, a railroad at a moment peculiarly under the ban of alleged over-capitalization, could not be sold on a basis to yield anything like 3.1 per cent. In fact they almost certainly could not be sold on twice as favorable an income basis; for short term notes and equipment trusts of the strongest railroads in the country are selling at better than 6.2 per cent. Yet since the Clover Leaf has five years before its rate of payment on the total amount of these bonds rises from 3.1 per cent. to 4 per cent., it is hardly fair to figure the investment at the extremely low prices now prevailing, which would probably give an income return on these bonds of 7 per cent. or more. Taking 6.2 per cent., twice the rate paid on the par value of the bonds, as a fair rate for the five years, we may consider the actual cash price paid for the Rock Island's Alton holdings as \$5,613,500, half the par value of the collateral trust 4 per cent. and 2 per cent. bonds. The Rock Island's original investment in Chicago & Alton stock is said to have been about \$10,000,000; on this basis the loss was about \$4,400,000. If there is to be a decided change for the better in stock market conditions, and continued prosperity, the rising value of the collateral trust bonds would lower the amount of this loss.

As for the physical aspects of the merger, there is one obvious advantage to both roads. By building seven miles of line from Panama, Ill., on the Toledo, St. Louis & Western 50 miles north-east of St. Louis, west to Litchfield, the eastern terminus of a Chicago & Alton branch line, the consolidated system will have a short through line from Kansas City east to Toledo and Detroit, giving a long haul on traffic between Kansas City and the East. Aside from this, there are no strikingly obvious physical advantages from the merger. A map on another page shows the relation of the two roads and also the Iowa Central and the Minneapolis & St. Louis, two roads controlled by the same interests as those at the head of the Toledo, St. Louis & Western. With the building of the short connection already mentioned, it will be possible to haul grain from points as far west as the Missouri river in northern South Dakota, east as far as Lake Erie over the system's own rails; but, as can be seen from the map, this would be a rather roundabout route. It would also be possible with the same limitation to form a through route from Chicago to Minneapolis and St. Paul and to South Dakota over the Chicago & Alton to Peoria, the Iowa Central to Albert Lea, Minn., and the Minneapolis & St. Louis to St. Paul and South Dakota. It is possible that the four roads will be more closely united in a single system with centralized management. They all serve rich traffic territory, but highly competitive. On all through business they must meet severe competition by better situated carriers; yet such a system is not without its possibilities.

#### "STRIKE" CHARTERS AND THEIR WARNINGS.

A phase of prospective street railway overcapitalization which made its appearance not long ago in Connecticut serves at once as a text and a warning to conservative capital in these hustling days when that kind of capital—along with more blameworthy sorts—is so commonly the object of public and legislative attack. We have heretofore had occasion to point out the symptoms and seriousness of the dropsy disease in street railway finance in both Rhode Island and Connecticut and how in the latter state there had come too late a public awakening and reaction, caused immediately by what was, in effect, the guaranteeing of a 4 per cent. annual dividend on some \$18,000,000 of watered stock of the Connecticut Railway and Lighting Company by the New York, New Haven & Hartford. This aroused public sentiment naturally gave the street railway promoters a pause; but it was only a temporary pause, evolving into a new and rather original form of subtlety.

At the opening of the last Connecticut legislature, and during the first few weeks allowed for the introduction of new measures, it was noticed that there were bills relating to street railway charters remarkable in number for a period of tight money and public suspicion about trolley enterprise, and in a state where, as it seemed to the expert eye, profitable trolley territory had been exhausted. At first these projects did not attract attention. They seemed independent of each other, isolated, and with no coherent and ulterior purpose. But presently it was observed that they seemed to focus



in a definite region along the shore and in rough parallelism to the New Haven company's steam line of about 50 miles between New Haven and New London, and reaching up toward Middletown, besides some other proposed parallels in other parts of the state. About the same time two other schemes came to the surface. They involved charters like that of the Connecticut Railway & Lighting Company, which gave large power of purchase, absorption and merger and unlimited privilege in the issue of stock. The "promoting" scheme in its full magnitude was finally brought to light, namely, the bunching of the street railway projects in one or two power companies, next either a "sell out" of the whole watered outfit to the menaced steam corporation or the building of the parallels and the enlargement of the club to pound the steam company into final surrender. Later in the session the scheme was substantially defeated.

This Connecticut case is cited here only as one of numberless instances elsewhere of the workings of "high finance" in its relations to legislation. The devices have been many: First there is the new charter, seemingly harmless in shape and formal in outward character but, hidden away in some obscure clause, containing the desired and dangerous powers. Next there is the "charter amendment," sometimes prolix and masking the same evil. Again, most subtle and dangerous of all, is the "merger" trick worked through the minor charter of a small railway enterprise. The small charter—so small as to the project that it quite escapes notice—is asked for and obtained readily. Next comes along, a year or two later, the true parent, the larger corporation, which, having acknowledged ownership of the small enterprise, asks for merger with acquisition also of its charter powers. Nobody in the legislature remembers what the small charter granted, and the merger bill that may invest the great corporation with immense and undreamed of powers, goes through with a snap on some day of high legislative pressure of business. Added to such examples are the multiplied cases of "hawk" charters obtained simply to be sold and, too often, charters with such a reach that they apply legally to enterprises far different than those indicated by any cursory reading of the text.

The average legislator, though he may be absolutely honest, is apt to be too ignorant or inexperienced to detect such charter stratagems. Railroad committees of state lawmaking bodies are too often "set up" to let just such projects through; and state railroad commissions are apt to deem prevention as beyond their own jurisdiction and refer them to the law-making responsibility. The public is protected from them in most cases only when it happens that some strong corporate interest is opposed. In the Connecticut case, for instance, it is doubtful whether the seeming "strike" on a large scale would have been exposed except for the antagonized interest of the New Haven company. But the public find the stratagems out at last, usually too late to be rectified by law, but not too late to excite public wrath. It would be interesting if we could measure how far that discovery, repeated year after year and driven into the public mind by repetition, now enters into the anti-corporation feeling of the country, that involves the railroads. It certainly is a component in that feeling not to be ignored. And its lesson to the corporations is that legislation, and particularly, charter legislation, when sought hereafter should be sought along straightforward and not devious lines.

To corporation interests that are unscrupulous, such an appeal, of course, is made in vain. But there are other corporation interests broad-minded and far-sighted enough, we trust, to see that trick legislation harvests in the end as its share of a general penalty greater loss than can be made good by transitory gain. In other words, as to such matters as stock watering, honest finance and the public are as one in partnership and should be equally aggressive in resistance. Had honest finance, expressed in the corporation form, realized that fact sooner, and with its keener and quicker intelligence set itself against the evil, we might now be hearing less of public prejudice and legislative inequity.

#### The Railway Employment Safety Appliances Committee.

"The Railway Employment Safety Appliances Committee" of the British Board of Trade is the name of a board of three gentlemen—H. A. Yorke, Richard Bell and Robert Turnbull—which has during the past 12 months been considering the question whether or not the hand brakes on freight cars can be arranged so that the brakeman can apply them or let them off from either side of the car; and the committee gives it up as an impracticable task. This committee was appointed by the Board of Trade a year ago last

April, and although it was instructed to examine, so far as it saw fit, any kind of appliance designed to diminish danger to railroad employees, it has thus far considered only this one subject. The reader will recall that seven years ago the English Parliament, after two years' investigation, passed a law dealing with a number of questions concerning safety appliances, chiefly questions connected with freight yard work, and that the Board of Trade two years later issued rules on the subject. The rules, however, did not cover the brake question and the appointment of this committee appears to have been in pursuance of the policy, begun in connection with the legislation of 1900, to do everything possible to meet the demands, some of them rather impractical, of the labor unions. Mr. Bell, the second member of this committee, is head of the Amalgamated Association of Railway Servants; Mr. Turnbull is Chief Passenger Manager of the London & North-Western Railroad, and Colonel Yorke, Chairman of the Committee, is the well known Chief Inspector of the Board of Trade.

The "Either-Side Brake" question has been agitated because when a shunter, in the hurry of his work, finds that a car which he wishes to move has the brake held on by the lever on the opposite side of the car, he is liable to risk his life by crossing to the other side of the car or train under dangerous conditions. The brakes of the English freight car ("waggon") are controlled by a long horizontal lever on the side of the car, and the men are most of the time on the ground. The weight of this lever, when the handle end is not fastened up, is alone sufficient to apply the brakes with considerable force. To apply it more forcibly the brakeman can press it down, while running along on the ground at the side of the car, or he may jump up and stand on the lever, utilizing the whole weight of his body. Still further, he may use a stick, somewhat larger than the "pick-handle" used by American brakemen, and by utilizing the sill of the car as a fulcrum he can secure the advantage of double leverage.

It is easy enough to arrange the two levers on the opposite sides of the car so that either one can be used to apply the brakes, but the difficulty is to interconnect these two levers so that when releasing one of them the other one shall also be unfastened.

The committee met 14 times during the year. Thirty or 40 brakes or models of brakes were examined and criticised or rejected, and then after a few weeks the same and other devices would be taken up again; but finally, after giving every opportunity to inventors and railroad companies, the committee decided that none of the appliances had sufficient merit to warrant its general adoption. Moreover, if a simultaneous movement of the two levers could be satisfactorily accomplished, there would always be danger that with men on opposite sides of a wagon, one of them, unknown to the other, would move the lever so as to cause bodily danger to the other man.

There are in the United Kingdom 1,400,000 vehicles to which the ordinary hand brake is applicable; of these 33,000 are already fitted with brakes which can be applied and released from either side; 172,000 have brakes which can be applied on both sides but not released. Included in the total mentioned are 650,000 private cars. The committee finds that where there are two levers they are often fixed so that both extend in the same direction from the middle of the car, whereas they ought to extend in opposite directions, so that the arrangement would be "cross-cornered."

In looking over the records of men killed and injured because of the lack of a lever on one side of a wagon, it was found that more men were killed when applying brakes than when releasing; so, finally, the committee recommended that the Board of Trade require after a certain date, that all new wagons have cross-cornered brake levers; that within seven years wagons having a lever on one side shall have a lever on the other side, and those having none shall have two; that within 10 years those having the levers single-ended be changed to cross-cornered; and that no either-side brake be put on hereafter unless it has been approved by the Board of Trade, on the advice of this committee.

The New York Central on Sunday last restored its New York City electrified terminal lines to "right-hand running," at the same time putting 13 miles of its elaborate new all-electric signaling in service. This was a great undertaking and it appears to have been carried out with a good degree of success. A brief account of it is given on another page. Trains were delayed on Monday forenoon and Monday evening, many of them for over an hour each, but Tuesday morning showed an improvement and Tuesday evening was almost normal.

These delays were due to instructions to lose a little time, to extreme caution on the part of engineers, to one switch failure, and to a few mistakes of signalmen. The task of the men on Monday morning was made harder by a heavy extra passenger movement. There were further delays on Wednesday, due apparently to failures in automatic signal working; but as a whole the work appears to have been highly creditable. Comparing the delays with the magnitude of the work the results appear to have been far more

satisfactory than on the occasion of former radical changes at the New York terminal. In changing the interlocking at 56th street, where the four tracks in Park avenue diverge to the station layouts, an exceptional record was made. Here a new interlocking plant had to be installed. An 88-lever all-electric machine replaced an 84 all-electric machine. The entire change was made from the old to the new machine and the new put in operation for traffic (at 4 a.m.) in just seven minutes. To make this change, 38 men were assigned. The last previous change made at this point was in April, 1906, at which time a low pressure pneumatic machine was replaced by the 84-lever all-electric machine. The change at that time consumed 25 minutes.

A description of the way in which the change was made is published on page 227.

## CONTRIBUTIONS

### The "Brother Jonathan" and the "Robert Fulton."

Binghamton, N. Y., Aug. 10, 1907.

TO THE EDITOR OF THE RAILROAD GAZETTE:

At the end of the year 1833 Stephenson & Co. built two engines named "Brother Jonathan" and "Robert Fulton" for the Mohawk & Hudson Railroad, which was chartered in 1826 and opened September 12, 1831. This railroad is now a part of the New York Central system. The builder's numbers of these locomotives were 60 and 61.

I do not know who designed these engines, but probably one of the two Stephensons, who founded their locomotive works at Newcastle-upon-Tyne in 1821, the business being still carried on under the name of Robert Stephenson & Co., but they have lately moved their shops to Darlington.

Herewith I send you a copy of the working drawing of the above named engines, which, although it is very imperfect, is the

motive with a leading truck, designed by John B. Jervis, Chief Engineer of the Mohawk & Hudson Railroad, and placed in service at the beginning of 1832, was an inside connected engine with the driving wheels behind the firebox, and its history will be found in the *Railroad Gazette*, Vols. III. and IV.

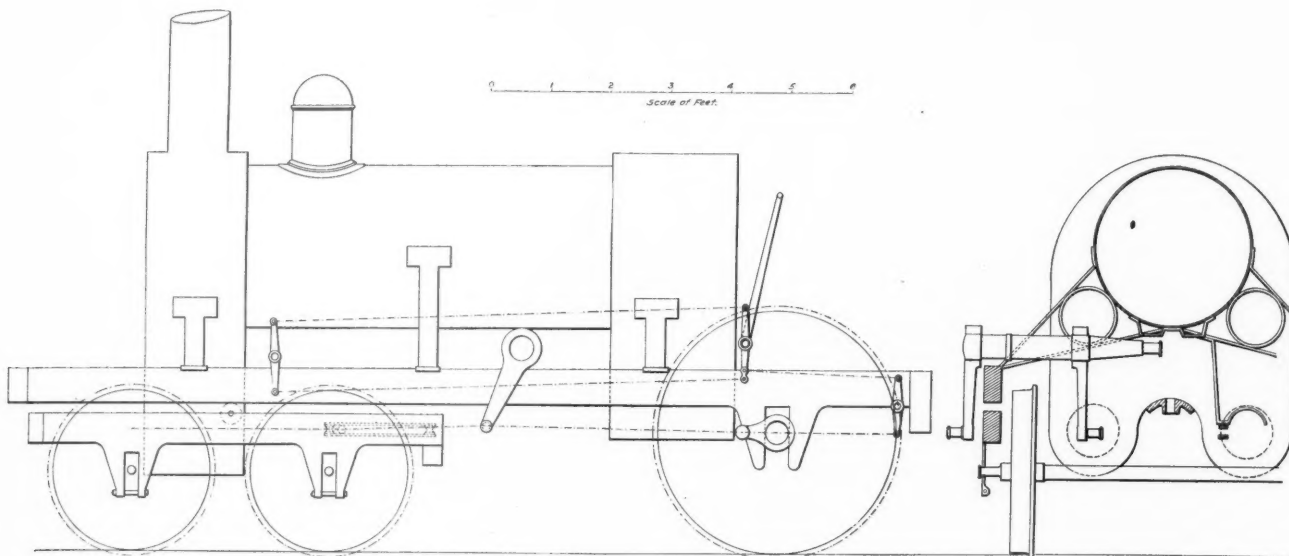
In the early days of the locomotive, many curious designs were brought out which quickly fell into disuse, although some of them were revived from time to time, and a few of them quite recently. A study of locomotive history reveals the fact that nearly every modern improvement in the locomotive, including the four-crank balanced engine, can be traced back to the early thirties, when George Stephenson was in the height of his power, and his "Rocket" was doing regular every day work. An illustration of the fact that history repeats itself may be made by taking the designs of locomotives having intermediate gear between the cylinders and driving wheels to balance the reciprocating parts without the use of four cranks. This was done as far back as 1833, but strong patent claims for these designs have been granted to more than one modern inventor, and I have reason to believe that the time is not far distant when we shall have a revival of this class of locomotive.

In the engines illustrated herewith there was no attempt to balance the reciprocating parts, since both inner and outer side levers rocked in the same direction. Had the inside arms been oppositely disposed to the outside arms, we should have had an example of the side lever locomotive which was introduced about the same time as these Stephenson engines, and drawings of which I may send you at some future time.

HERBERT T. WALKER.

### Railroad Legislation in Pennsylvania.

The laws passed this year in Pennsylvania to establish a Railroad Commission and to reduce passenger fares have already been noticed in the *Railroad Gazette*. Besides these the Legislature also passed a number of less important acts, a summary of which is given



Working Drawings of Stephenson's Engines Numbers 60 and 61 for the Mohawk & Hudson Railroad, 1833-34.

only one in Messrs. Stephenson's possession, as they recently informed me.

The cylinders were inside the smokebox. Under the barrel of the boiler there were a pair of vibrating shafts, each having an inner and an outer arm. The inside arms received motion from the pistons and usual rods, and transmitted it by the outside arms and connecting rods to the driving wheels. This was probably done to retain the advantage of inside cylinders with the driving wheel position afterwards adopted by Baldwin. It also got rid of the long connecting rod, which was an objectionable feature of the early Baldwin engines.

The cylinders were 10 in. diameter by 15 in. stroke; driving wheels, 48 in. diameter. The eccentric blades ran back from the driving axle and were connected by rocking arms and drop hooks to the reversing levers, and from thence forward to the rocking shafts behind the smokebox. The valve chests must have been at the top of the cylinders.

In reference to the Baldwin engines it may be noted that the idea of placing the driving wheels behind the firebox did not originate with him as is generally supposed, for his first engine of this design was not completed until February 18, 1834, but the first loco-

herewith, together with some of the details of the Railroad Commission Law.

An Act prohibiting the placing of lights at places where they may interfere with the view of railroad signals.

One requiring railroads to report Aug. 31, and every third year thereafter, the exact number of statute miles of line operated; penalty for violation \$5,000.

One forbidding a demurrage charge of more than \$1 per car per day; free time 48 hours.

One prohibiting common carriers from engaging in mining or manufacturing. Mining or manufacturing companies are permitted to haul their own product for a distance of 50 miles.

Forbidding railroad officers and employees to have any interest in any coal or mining or manufacturing property along the line of the railroad after Jan. 1, 1908; penalty \$250 to \$1,000 fine or three months to one year's imprisonment.

Prohibiting railroad companies from acquiring control of competing parallel street passenger railway lines.

Requiring railroad companies whose lines pass through forest land containing oil or gas wells to remove all inflammable material from the right of way at least once annually, also to provide suf-



ficient trackmen to extinguish fires; also to provide engines with spark arresters.

A number of laws were passed prescribing penalties for violation of provisions of the constitution; and all of the laws above mentioned have severe penalty clauses.

A law was passed permitting street railways to carry express and light freight, and granting to them power to acquire a contemplated route by condemnation proceedings where 51 per cent. of the property owners consent.

The Railroad Commission law provides that one of the three members shall be learned in the law. One of the three is to be appointed for five years and ultimately five years will be the term of all the members. The Governor is to designate the Chairman. The Commission is to have a Secretary, an Attorney and a Marshal. The Attorney is to conduct the examination of witnesses at hearings, when requested to do so by the Commission, and is to assist the Attorney General of the state in all actions brought by him incidental to the recommendations and rulings of the Commission. The Commission may appoint other officers including an inspector, who must be a civil engineer skilled in railroad affairs and another inspector expert in electrical affairs. The office of the Commission will be in Harrisburg. Its proceedings shall be public upon the request of either party interested. The act appears to be intended to give the Commission authority over all common carriers, though we do not find a clear statement to this effect; but section six, defining the term "common carrier" includes persons and corporations transporting freight or passengers by water as well as by railroad or electric railway; it also includes pipe lines "engaged in the transportation of oil" and sleeping car companies "engaged in transporting passengers" and express companies "engaged in transporting property upon any railroad, electric railway, street railway or by water"; also telegraph and telephone companies.

The Commission after full hearing may declare rates unjust and recommend what will be the just rate to be thereafter observed as the maximum. (Section 8.)

Section 9. If a shipper or consignee renders any service in connection with transportation, the allowance therefor shall not be more than is just and reasonable.

Section 10. The Commission or its agent may enter and remain during business hours in cars, offices and depots, and may examine books, etc. It may order the production of testimony or of papers, and in case of disobedience may call on the Court of Common Pleas to enforce such an order. Where the Court finds that neglect or refusal of a witness is occasioned by the advice or consent of a carrier, the fine against the witness may be collected from the carrier.

On request of the Secretary of Internal Affairs or the Legislature, or the Governor, the Commission may have a hearing on any proposed change of law relating to common carriers.

Section 12. The Commission may require every common carrier to file with it a copy of its annual report which is sent to the Interstate Commerce Commission.

Section 13. The Commission is to investigate accidents when deemed advisable. Accidents must be reported immediately after their occurrence.

Section 14. The Commission is to regulate the establishment of crossings of one railroad with another, including electric railways, and shall recommend what safety appliances are necessary both at new crossings and at existing grade crossings.

Section 15. If a common carrier violates the law or neglects its duty or usurps authority not granted by law, the Commission is to notify the carrier; and, if the offence is continued, certify the matter to the Attorney General.

Common carriers must within 30 days notify the Commission whether or not they intend to comply with an order.

Section 17. In case of excessive rates or insufficient or unsafe fixtures or works, or insufficient trains or cars or faulty modes of operating, the Commission shall notify the carrier what to do, and if after full hearing the carrier refuses or neglects, or fails to satisfy the Commission that nothing should be done, the Commission must certify to the Secretary of Internal Affairs and the Attorney General the facts for their action according to law.

In case of a proposed increase in stock or bonds, the Commission may employ experts to investigate the necessity for the proposed increase, and report to the Secretary of Internal Affairs.

Section 18. No examination, request or advice of the Commission nor any investigation or report made by it shall impair in any manner or degree the legal rights, duties or obligations of any common carrier or its legal liabilities for the consequences of its acts or of the negligence or mismanagement of any of its agents or employees.

Section 19. Common carriers must furnish the Commission any necessary information concerning rates, contracts, etc. The Commissioners shall not make this information public unless the public interest requires publicity, nor if publicity would injure the common carriers of the state.

Section 21. An annual report is to be made to the Governor by the second Monday of January, and a duplicate filed with the

Secretary of Internal Affairs. Nothing in this act shall impair the authority of the Secretary of Internal Affairs in the exercise of supervision of railroads and canals.

Section 23. Salary of Commissioners, \$8,000 each; Secretary, \$4,000; attorney, \$4,000, and marshal, \$2,500.

Section 24. The total annual expenses of the Commission shall not exceed \$100,000.

This Act goes into effect January 1, 1908.

#### Newark Warehouse of the Central Railroad of New Jersey.

The Newark Warehouse Company, a subsidiary company of the Central Railroad of New Jersey, on August 1 formally opened for service its building at Mechanic, Lawrence and Ward streets, Newark, N. J. The accompanying photographs and drawings show the size and general arrangement of this modern freight handling depot. Freight cars are switched into the building on the second floor level, from which their contents are unloaded either to be lowered to the floor below and loaded directly on trucks, for which there are driveways on this floor, or to the platforms and then by a complete elevator system lifted to the floors above, there to be stored awaiting consignee's orders.

The building is 357 ft. by an average depth of 145 ft.; it is 102 ft. high and has a ground area of 52,000 sq. ft. and a floor area

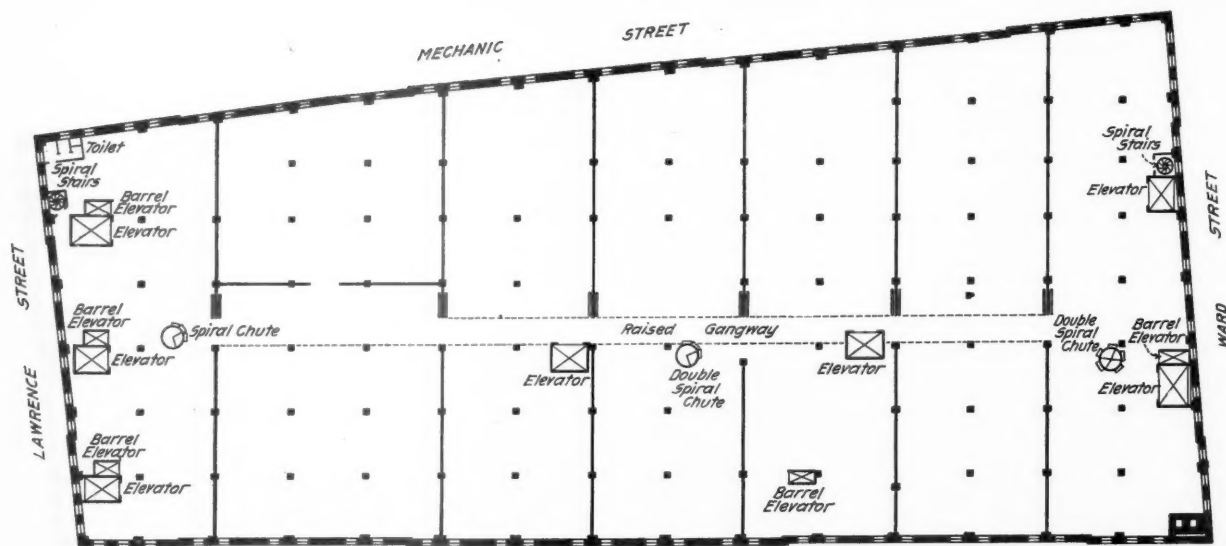


Newark Warehouse, Showing Wagon Entrance.

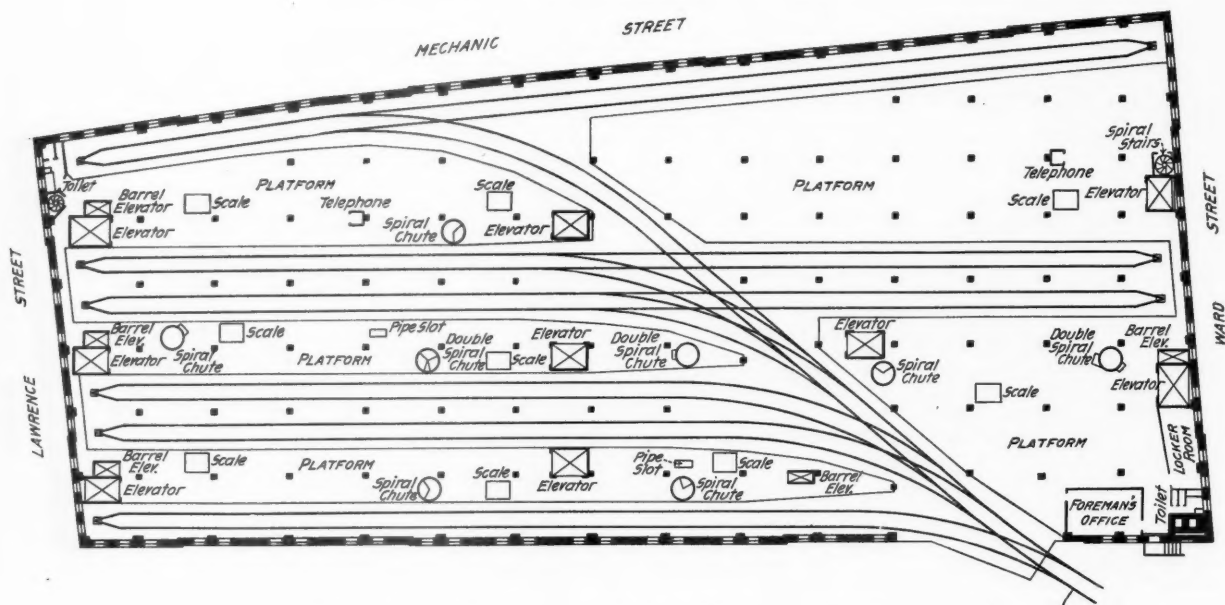
of 370,000 sq. ft. It occupies the whole of a rectangular city block just between the point at which the Central Railroad of New Jersey tracks into Newark cross over the main line of the Pennsylvania and the Broad street terminal station in Newark. The warehouse has six floors and a basement. The first floor is the team floor; the second, the track floor; the third, fourth, fifth and sixth, the storage floors. The total storage capacity is about 1,200 carloads of freight.

The whole building is made of reinforced concrete and fireproof. The construction is steel frame and concrete wall, with a foundation of steel beam grillage and concrete. The floors are of metal plate and reinforced concrete, designed to support 300 lbs. per sq. ft. throughout and 500 lbs. per sq. ft. in certain areas. The partitions are steel frames and hollow fireproof tile. Windows and sky-lights have metal frames and wire glass and close automatically. All partition openings are protected by automatically closing fireproof doors.

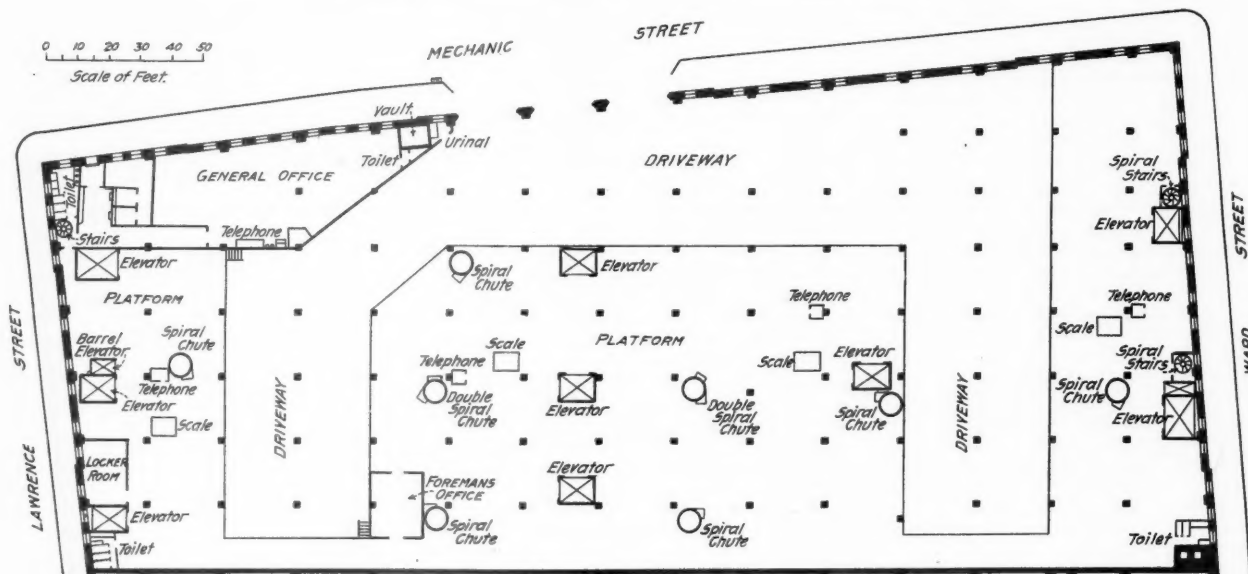
There are nine platform elevators, two 8 ft. x 12 ft. and seven



Typical Plan of Upper Floors; Newark Warehouse.



Plan of Second Floor Showing Railroad Tracks and Platforms.

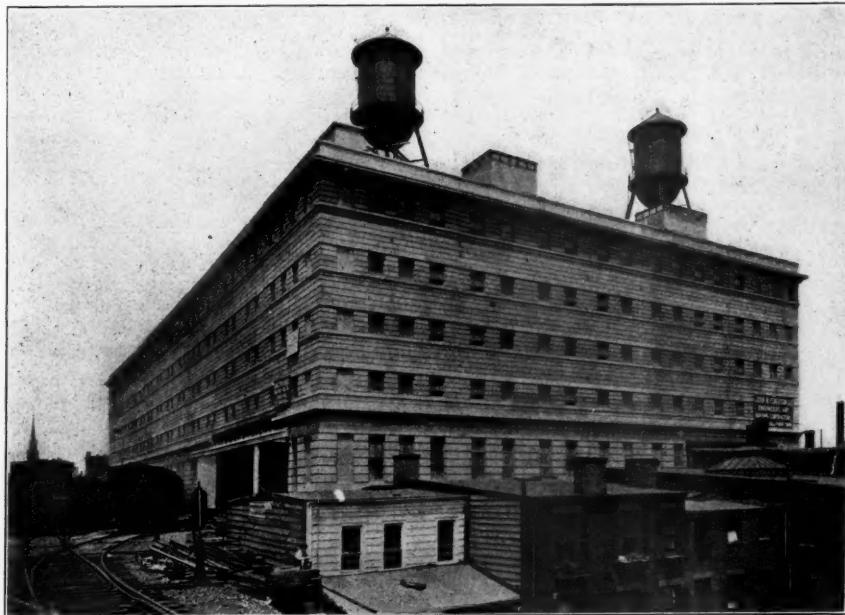


Plan of Street Level Floor Showing Driveways and Elevators.



7 ft. x 10 ft., all of 6,000 lbs. capacity; also five barrel elevators with capacity of eight flour barrels per minute each, and eight spiral chutes, pneumatic chutes for carrying invoices, etc. The building is lighted by electricity throughout, and has complete telephone connections. The fire protection for merchandise on storage consists of automatic Springer equipment with two 750-gal. electric-driven fire pumps.

The location is convenient to the wholesale business district of Newark. The building is approached by well paved streets, and the teamways on the first floor are large enough to furnish access to platform space of 25,800 sq. ft., on which goods can be handled



View of Newark Warehouse from Central Railroad of New Jersey Tracks.

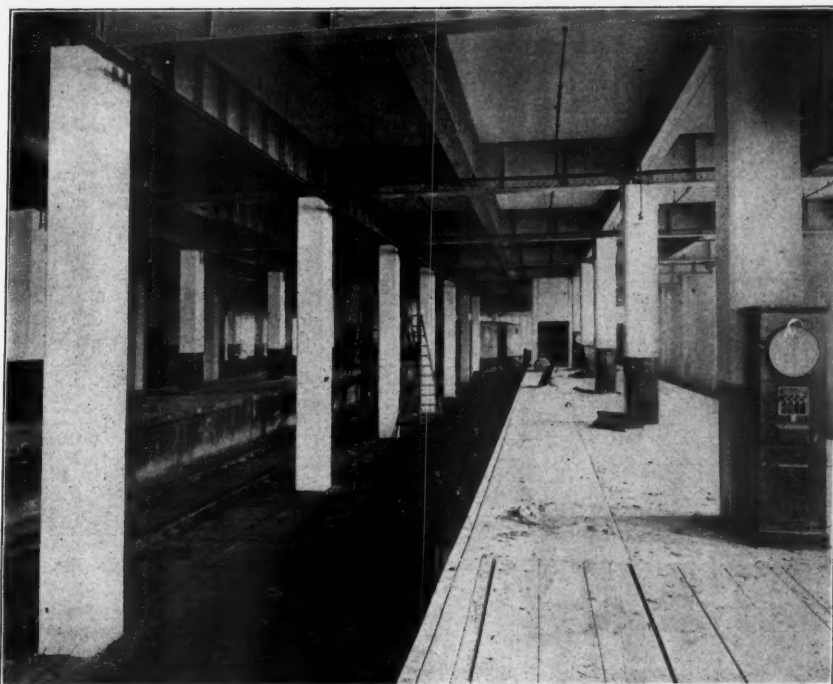
for team delivery; this floor is to be used only for this purpose. On the track floor there is standing room for 43 cars alongside freight platforms.

This warehouse is worthy of note because it represents the latest and most improved designs and methods for such a building, and also because it is an example of a railroad entering indirectly in the warehouse business. The warehouse company suggests that merchants can abandon local storage or relieve crowded storage space by sending their goods to the warehouse, where storage charges will be less than the cost would be to the merchant himself, with the great additional advantage that goods can be received or shipped without any cartage expense. The warehouse company is prepared to act as the representative of merchants and handle goods as directed. The manufacturer may at certain seasons, when it is necessary to hold goods to accommodate trade conditions, store them with the warehouse company, who will insure them and act as shipper, distributing the goods as ordered and furnishing the manufacturer with negotiable warehouse receipts that may be realized on at once if desired. The broker or commission merchant, who sells and buys, can get along with only an office or desk-room by having the warehouse company take care of his goods, fill the orders that he issues and forward his consignments, all for less expense than can be secured elsewhere. He can also in this way buy large quantities of goods and hold them for change in market and have the warehouse company care for them and issue negotiable warehouse receipts. The connection of the railroad with such a project lies in the fact that if the warehouse company furnishes satisfactory service to these different classes of business men, the business of these men will, as long as they are using these warehouse facilities, naturally travel over the Central Railroad of New Jersey. For the information, photographs and drawings published herewith, we are indebted to Joseph O. Osgood, Chief Engineer of the Central Railroad of New Jersey, and Engineer of the Newark Warehouse Company.

#### Reversal of Track Running on the New York Central.

On Sunday last, August 25, the trains of the Harlem division of the New York Central between New York and Croton Falls, 48 miles, began running on the right-hand track, reversing the left-hand practice that has been in vogue for the past 12 or 15 years; and at the same time the section of 13 miles nearest New York, all four track, called the Electric division, was the scene of a sweeping change in signaling, the new all-electric block and interlocking signals being put in service, and green adopted for the night all-clear indication. These signals have been in course of construction for the past year and a description of them was published in the *Railroad Gazette* of June 29, 1906.

The line may be briefly described as follows: The southern terminus consists of the old (Grand Central) and the new (Lexington avenue) yards side by side. These converge at 56th street, where the four-track line and tunnel begin. The outside tracks are numbered 1 and 4. The tunnel extends north from 56th street to 98th street, two miles. The first station is 125th street. One-half mile farther is the Harlem river draw (135th street). At 149th street is Mott Haven Junction, 5¼ miles from the terminal, where the Hudson division diverges to the left. The Electric division extends to Wakefield, 7¼ miles from this junction and 12½ miles from the terminals. Just south of Wakefield the New York, New Haven & Hartford diverges to the right. Following is an account of the work done on the Electric division. Between Wakefield and Croton Falls a similar change was made, involving chiefly automatic block signals which had to be changed but not renewed. Here as on the Electric division the night fixed signal indications were changed from white to green for proceed and green to yellow for caution. On part of the territory a



Track Floor of Warehouse, Showing Tracks and Platforms.

number of new style "D" Union electric motors were put in service.

#### CHANGES ON ELECTRIC DIVISION.

Tracks 2 and 3 between 56th street and Wakefield were put out of service at 7 p.m. Saturday and were restored to service under right-hand traffic at 4 a.m. Sunday; also tracks 2 and 3 between Wakefield and Mount Vernon.

At 4 a.m. Sunday tracks 1 and 4 between 56th street and Wakefield were put out of service and at 8.30 a.m. were restored to service under right-hand running between Wakefield and Mott Haven Junction. Between Mott Haven Junction and 56th street these

tracks were put in service under right-hand running at 7.30 p.m. Sunday.

All of the new automatic signals were set up (minus the blades) and worked for a number of days before they were put in service; so that at the final moment the principal part of the work on these was to attach the blades to the new signals and take the blades and lamps off from the old ones. Between 98th street and Mount Vernon the old signals were controlled manual. The work at interlockings was of course more complicated.

The total mileage affected by this reversal was approximately 13.37 miles of four track and one-half mile of double track. On this territory there was a drawbridge equipped with mitre end lift rails. The position of these lift rails was reversed to accommodate the new conditions. The drawbridge was interlocked with an interlocking plant which was kept in service on two tracks during the transition period and a new all-electric machine was put in use in place of it. In other words, while work was progressing on tracks 2 and 3 the mechanical machine controlled the draw and protected movements over the two tracks then in service (1 and 4) and the new electric machine was installed on 2 and 3 so that when the traffic was reversed and these tracks put in service protection was afforded by the new machine. At the same time all of the lock and block apparatus, including torpedo machines, gongs, mechanical and electrical indicators in the Park avenue tunnel, were rearranged in all their details to accommodate right-hand movement on tracks 2 and 3 prior to the reversal of traffic, and the same thing was done to tracks 1 and 4 while they were out of service.

At 56th street trains are diverted to the two separate terminal stations. Here an all-electric machine has been in service for several months. This was abandoned and a new machine substituted, adding a number of new switches and signals. Also the electro-pneumatic interlocking at Mott Haven Junction was entirely rebuilt under traffic, as well as a second electro-pneumatic at the junction on the west side of Mott Haven yard, where it connects with the Hudson division.

The change in the tunnel not only affected the lock and block apparatus but also five mechanical machines and two low-pressure pneumatics as well. The revolving signals which have been in use in this tunnel for a number of years had to be connected to the towers for right-hand running and their indications were changed from white to green for proceed and from green to yellow for caution.

At the same time that these changes were being made, the two low-pressure pneumatic interlocking machines in the old terminal and one all-electric in the Lexington avenue terminal were rearranged for right-hand routes. The mechanical interlocking plants at 106th street and at Mount Vernon were also changed under traffic.

Altogether the change brought about the abandonment of five mechanical, one low-pressure pneumatic and four electro-pneumatic interlocking plants, while seven electric interlockings were put in service. To accomplish this work 575 men were employed in the various signal, track and bridge departments, and the entire reversal was accomplished by 4 p.m. on Sunday, and all tracks were restored to service at 7.30 p.m.

At the time that this reversal was taking place it was also necessary to change from white to green for proceed and from green to yellow for caution on the night signal indications throughout all of the territory named, and also the old and new terminals; also between High Bridge and Spuyten Duyvil cut on the Hudson division.

The following is a list of the plants affected:

MECHANICAL PLANTS ABANDONED.		Lever.
126th street (Harlem) .....	14	
Harlem River draw .....	15	
135th street .....	13	
Walton avenue .....	8	
Temporary interlocking with New Haven connection at Wakefield .....	20	
	—70	
ELECTRO-PNEUMATIC PLANTS ABANDONED.		
156th street .....	9	
Melrose .....	8	
Botanical Garden .....	8	
Woodlawn .....	15	
	—40	
Low pressure pneumatic, 140th street also abandoned. .	3	
Also all-electric at 56th street and Park avenue .....	84	
	—87	
Grand total abandoned .....	197	
NEW ALL-ELECTRIC PLANTS PUT IN SERVICE.		
156th street .....	35	
Melrose .....	53	
Botanical Garden .....	34	
Woodlawn .....	67	
Wakefield engine house .....	20	
Wakefield, north end of yard .....	35	
Harlem River draw .....	31	
	—284	
CHANGED WHILE TRAFFIC WAS BEING MOVED; IMPOSSIBLE TO TAKE OUT OF SERVICE.		
Mechanical.		
72d street (tunnel) .....	8	
86th street .....	8	
96th street .....	6	
106th street (crossover) .....	32	
Mount Vernon .....	10	
	—62	

Low-Pressure Pneumatic.		
59th street (tunnel) .....	9	
49th street tower (terminal) .....	10	
Tower No. 1 (terminal) .....	25	
	— 44	
Electro-pneumatic.		
Mott Haven Junction (MO) .....	35	
Mott Haven Junction (MJ) .....	23	
	— 58	
All-Electric.		
Tower C (new terminal) .....	2	
56th street .....	88	
	— 90	
Grand total .....	254	

The signals placed in service supplied 344 high indications (homes and distants) and 201 dwarfs.

In order that this work should be efficiently handled a separate system of despatching for work trains was established. Work trains were assigned to the tracks which were put out of service, and these were used for the handling of material and men from one point to another. North of Mott Haven Junction electric work trains were used and south of Mott Haven Junction steam engines, it being found advisable to do so on account of the added convenience of cutting off the current from the rails on which work was in progress.

All of the forces employed on this work were handled through this despatching system under the direct charge of H. S. Balliet as installation director, who worked by telegraph from his office at No. 5 Vanderbilt avenue, west of the Grand Central Station. All the men assigned to the work reported to that office and were not permitted to move from one locality to another without first receiving its authority. In this way the work was concentrated very effectively.

The details of the work were handled through the Electric Zone Signal Department under the charge of Azel Ames, Jr., Signal Engineer; the General Railway Signal Company, W. G. Hovey, Construction Manager; C. E. Lindsay, Engineer Maintenance of Way on the Electric division, and H. S. Balliet, Engineer of Maintenance of Way of the Grand Central Station and Signal Engineer of the Electric division.

At the Harlem river draw the interlockings have been so designed that under the new arrangement considerable time is saved in opening and closing the draw. The new interlocking (all-electric) is so arranged that the draw and lever controlling the engine part of the draw as well as each individual lift-rail are bolt locked, with a facing point lock. Derails of the Hayes type are fixed on each track at each end of the draw.

The signals for the normal direction are standard semaphores. For reverse movements, standard electric dwarfs are used, of two types; one the standard shape of arm, of small size, and the other a disk. The disk is used on but one track, and this is on account of scant clearances.

On the north fixed span there are automatic home and distant block signals. These were put in for the purpose of better spacing the trains. The full block over-lap is used with all of the signals north of the tunnel. Through the tunnel, the controlled manual system continues in service, the levers being controlled by track circuits throughout the block, and with 800 ft. over-laps.

Under the present arrangement—that is, as long as steam engines are used in the tunnel—there will be no change in block sections, but after automatic signaling is introduced in the tunnel there will be one more inbound and two more outbound blocks on each track. Between 98th street and Mott Haven Junction the aggregate number of blocks on the four tracks has been increased from 13 to 26; and between Mott Haven and Woodlawn from 25 to 46.

#### A New Transcontinental Cut-Off for the Southern Pacific and the Santa Fe.

With the taking over last April of the Phoenix & Eastern, a Santa Fe branch line running from Phoenix, Ariz., east 100 miles to Winkelman on the Gila river, by the Southern Pacific, and the election of Epes Randolph, President of various Southern Pacific lines in Arizona, as its President, a definite step was taken in the development of what will in all probability ultimately become a new transcontinental cut-off for both the Southern Pacific and the Atchison, Topeka & Santa Fe.

Plans by both companies for the development of a new and better transcontinental line through Arizona have been in the making for at least two or three years. The accompanying map shows the present location of the through lines of the two roads and indicates, as nearly as it is possible to do at present, the extent of the new cut-off line. The recently completed Belen-Texico cut-off of the Santa Fe is included in the map as well as its eastern connection from Texico northward toward Kansas City, and the proposed connection southeast to Brownwood, Tex., and thence to Galveston.

The heavy lines on the map west of Belen mark the known or the probable location of the new transcontinental cut-off of the two roads. The Phoenix & Eastern, as shown, runs from Phoenix,



Ariz., southeast to Florence, where it meets the Gila river and then follows up the river eastward to Winkelman, the present terminus. At San Carlos, about 34 miles up the Gila river beyond Winkelman, the Gila Valley, Globe & Northern line of the Southern Pacific crosses the river. To the north it runs to Globe; to the south, it follows up the river as far as Solomon (formerly Solomonville), and then turns south to connect with the Southern Pacific main line at Bowie.

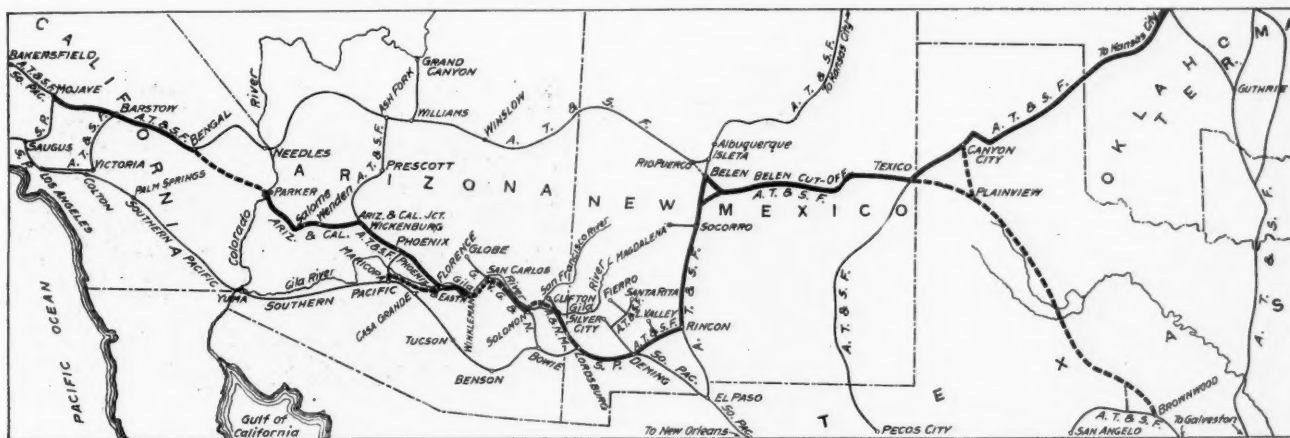
The route between Winkelman and San Carlos was for years disputed by the Southern Pacific and the Santa Fe. As nearly as can be ascertained, the Santa Fe surveyed the first route northeast up the Gila canyon from Winkelman. This was an invasion of Southern Pacific territory, as such a line not only cut across the Gila Valley, Globe & Northern, but if extended less than 100 miles further would reach the Clifton mining district, now served only by the Arizona & New Mexico, which is the line owned by the Arizona Copper Company connecting the Clifton mines with the Southern Pacific main line at Lordsburg, N. Mex. The Southern Pacific at once hurried a surveying party to the Gila canyon and located almost exactly the same line that the Santa Fe had adopted from Kelvin, 15½ miles west of Winkelman, east to San Carlos. The Southern Pacific map of this route was filed a few hours before the Santa Fe map. The rights under these surveys were then carried into the local courts, where there were decisions and counter-decisions almost without number. Meanwhile the Santa Fe built and put in operation its line from Florence east to Winkelman. After Santa Fe trains were already running over the track on regular schedules a decision was handed down by one of the local courts awarding 17½ miles of the right-of-way from a point two miles west of Kelvin east to Dudleyville, which is two miles east of Winkelman, to the Southern Pacific, but forbidding either company to use this track for commercial purposes until the case was finally decided. On appeal, the Supreme Court of Arizona

under way. The Arizona & California is now finished to the Colorado river, and its ultimate destination has been announced as Bengal, Cal., on the present Santa Fe main line, 89 miles west of the Colorado river. Bengal is to be the western end of the new transcontinental cut-off.

On the east, the Santa Fe plans have not been made public. The map shows how the Gila Canyon line could be reached over existing Santa Fe lines and a short stretch of the present Southern Pacific main line. This is a roundabout route but is marked out here in the absence of any official or semi-official information as to where a more direct connection with the new cut-off line is likely to eventually be built. A connection from Socorro, N. Mex., to the headwaters of the San Francisco river, thence down that river to its junction with the Gila near Clifton looks feasible on paper, but this route we are informed is more or less impracticable from an engineering standpoint and therefore is not ever likely to be built. Some such through connection, however, would seem to be a necessary part of the eventual plans of the Santa Fe if it is to share most efficiently in the new cut-off line through Arizona.

The connection on the east as shown on the map is as follows: A short connection will probably be built from the Belen cut-off to the present El Paso line, which will be followed as far south as Rincon, N. Mex., from which a Santa Fe branch now runs to Deming on the Southern Pacific. From here the route is over the Southern Pacific to Lordsburg, near the New Mexico-Arizona boundary, 60 miles. From Lordsburg the route would be the same for both Santa Fe and Southern Pacific.

Leaving the main line at Lordsburg, it would be either over the Arizona & New Mexico road nearly as far as Clifton, thence down the Gila river to Solomon, or by a new line built direct from Lordsburg to Solomon. From Solomon the route is over the Gila Valley, Globe & Northern (part of whose line is to be changed as



A Proposed Transcontinental Cut-Off Through Southern Arizona.

returned the track to the Santa Fe, pending a further appeal to the United States Supreme Court, on condition that the Santa Fe give a bond to indemnify the Southern Pacific in case the Santa Fe lost the final appeal. In order to strengthen its demands for the contested right-of-way the Southern Pacific in the fall of 1904 put a considerable force of men at work grading the proposed route east of Dudleyville. In November of that year there were about 500 men employed. Before work was stopped, early in 1905, grading was nearly finished from Winkelman through the lower Gila Box canyon, that is, for about 10 miles up the river. Meanwhile the Santa Fe awaited the final decision of the case.

The Southern Pacific's grade through the Box canyon is on the north side of the Gila river. The contest between the two companies was not for a route where there was only one possible location, for from an engineering point of view there is little difference in the difficulties of construction on the two sides of the river through the canyon; but it was for ownership of an important feeder line over a route where it would not pay to build two competing lines. The decision of the United States Supreme Court was in favor of the Santa Fe, but by the sale of the Phoenix & Eastern to the Southern Pacific interests, ownership of the proposed route through the Gila canyon finally falls, as it should naturally from its territorial location and connections, to the Southern Pacific.

It is probable that this line was turned over by the Santa Fe to the Southern Pacific in course of arrangements for a new through line through Southern Arizona for both railroads. For the past three years construction work has been under way on a Santa Fe branch line, the Arizona & California, from Wickenburg, on the Ash Fork-Phoenix line, westward to the Colorado river. This is at present an undeveloped territory, though mining development is

shown) to San Carlos, where it would meet the extension of the Phoenix & Eastern line through the Gila canyon at its eastern terminus. Over the Phoenix & Eastern the route would run to Phoenix, over the Santa Fe to Wickenburg, and the Arizona & California to Bengal.

At Florence the Southern Pacific could swing southward again and connect with its present main line west of Tucson by building a short branch line surveyed some time ago from Florence to a point on the Maricopa & Phoenix & Salt River Valley line of the Southern Pacific near Maricopa. The more probable route, however, for Southern Pacific through traffic is over the Santa Fe route already described via Phoenix, Wickenburg and the Arizona & California to Bengal. Bengal is on that section of the present Santa Fe main line between Needles on the Arizona-California boundary and Mojave, Cal., which is owned by the Southern Pacific but leased to the Santa Fe. At Mojave the Southern Pacific and Santa Fe main lines join and run over a joint piece of track to Bakersfield. By a rearrangement of the lease, the Southern Pacific could have running rights for traffic from the new cut-off over the Santa Fe line from Bengal to Mojave and at Mojave connect with its present line.

Adoption of these plans will result in changing the present transcontinental routes of both roads for many hundred miles. On the Santa Fe, from Rio Puerco, N. Mex., to Bengal, Cal., is 621 miles. Adding the approximate length of the connection from the new Belen cut-off to the present main line at Rio Puerco, the distance from Belen to Bengal by existing lines is about 640 miles. Of the projected route west of Belen already described there are three sections not yet built, so that it is impossible to get an exact estimate of the distance, but from Belen to Bengal the through route outlined on the map, which is undoubtedly, as already explained, considerably longer than any which is likely to be eventually

adopted, would probably be about 800 miles, made up as follows:

	Miles.
Belen, N. Mex. to Rincon .....	A., T. & S. F. 146
Rincon to Deming .....	A., T. & S. F. 53
Deming to Lordsburg .....	So. Pacific. 60
Lordsburg, N. Mex., to nr. Clifton, Ariz.	A. & N. M. 65
Point near Clifton to Solomon .....	Estimated. 42
Solomon to San Carlos .....	G. V., G. & N. 59
San Carlos to Winkelman .....	Estimated. 25
Winkelman to Phoenix .....	P. & E. 96
Phoenix to Wickenburg .....	A., T. & S. F. 54
Wickenburg to Colorado river .....	Ariz. & Cal. 113
Colorado river to Bengal, Cal. ....	Located. 92
Total .....	805

If the new through line of the Santa Fe east of Belen is counted in, the amount of new through line eventually to be used by that road is more than double this figure. From Newton, Kan., to Rio Puerco by the present through line via the Hutchinson cut-off is 737 miles. By the line from Newton southeast to Texico and Belen, the southern part of which is shown on the map by a heavy line, it is 716 miles; adding 19 miles as before for the distance from Belen to Rio Puerco, the total is 735 miles, the saving by the new line being in grades rather than in distance.

For the Southern Pacific the distance is less. From Lordsburg to Casa Grande over the present line is 230 miles. The new short cut-off would probably approximate the same length. From Lordsburg, N. Mex., to Mojave, Cal., by the present line is 765 miles. The new cut-off between these points would probably be just about 700 miles long, made up as follows:

	Miles.
Lordsburg, N. Mex., to Bengal, Cal. ....	As above. 546
Bengal to Mojave .....	A., T. & S. F. 163
Total .....	709

But saving in distance is not the object of the new cut-off line for either road. It is being built to get better grades and curvature. There are steep grades on the existing lines of both roads to be avoided. On the Southern Pacific in the neighborhood of Benson, Ariz., there is a ruling grade both east and westbound of 74 ft. to the mile, or 1.4 per cent. On this 164 miles between Lordsburg and Tucson there are total ascents of 2,148 ft. westbound and 4,003 ft. eastbound. These would be avoided by even the short Lordsburg-Casa Grande cut-off. Further west there are heavy grades which would be avoided by using the longer cut-off all the way to Mojave, Cal. Between Palm Springs, Cal., and Colton, 49 miles, the limiting gradients are 103 ft. to the mile, or 1.9 per cent. westbound, and 104 ft. eastbound, with total ascents of 1,898 ft. west- and 1,612 ft. eastbound. Between Colton and Los Angeles, 57 miles, the maximum grade exceeds 1 per cent. both ways, being 66 ft. to the mile, or 1.2 per cent. westbound, and 64 ft. to the mile eastbound, with total ascents of 395 ft. west- and 1,066 ft. eastbound. Thus such a new cut-off line would avoid three grades of over 1 per cent. both east- and westbound with total ascents of 4,441 ft. west- and 6,681 ft. eastbound.

On the Santa Fe between Winslow, Ariz., and Needles, Cal., 292 miles, there are 5,307 ft. of westbound and 9,678 ft. of east-

bound ascents with ruling grades of 75 ft. to the mile (1.4 per cent.) westbound, and 137 ft. to the mile (2.5 per cent.) eastbound. From Needles west to Goffs, 31 miles, there is a rise of 2,104 ft. to the top of the Piute summit, and from Goffs west, a fall of 1,876 ft. in the 46 miles to Bengal. The Piute summit has an elevation of 2,580 ft. against a maximum elevation of 1,053 ft. over the Old Woman Mountain summit which the Arizona & California is to cross between the Colorado river and Bengal.

As the new line is not yet built it is impossible to say how much saving it will show in gradients and curvature over the existing lines, but as it follows water courses for much of its distance and has been laid out with the idea of improving on the existing roads, it is fair to assume that it will be a much more efficient line to operate than the present through line of either road.

#### Progress on the Florida East Coast's Key West Extension.

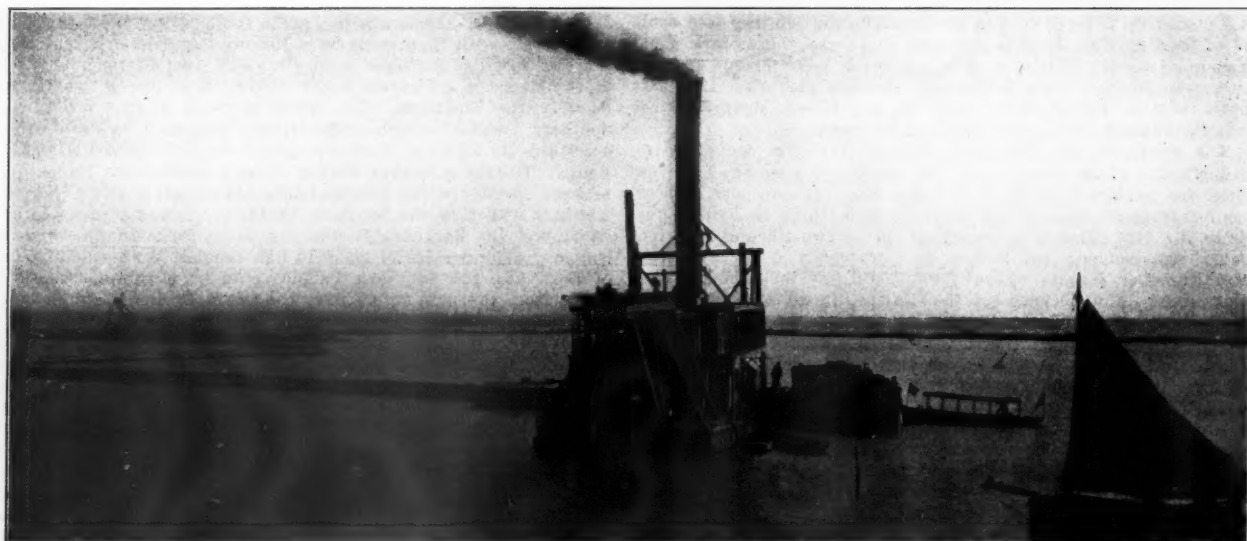
Rapid progress is being made on the Key West extension of the Florida East Coast Railroad, and unless some unforeseen difficulties arise or a violent tropical storm destroys some of the water work trains will be running over the "ocean route" within two years. The first locomotive crossed from the mainland, south of Homestead, over the drawbridge at Jew Fish creek to Key Largo, six months ago, and construction trains are now running over half the distance from Miami to Key West. Most of the water construction, however, lies west of the Matabcombe keys, so work over the balance of the line may prove relatively slower. All told there will be a little more than 5½ miles of concrete arches, which will require 206,100 cu. yds. of sand, 286,800 barrels of cement, 176,900 cu. yds. of stone and 4,810 tons of steel. One of the accompanying photographs shows a section of the Long key viaduct under construction.



Embankment Thrown Up by Dredging.

Nearly 50 of the 184 concrete arches required at this point to connect with Conch key have been finished. They rise 31 ft. above the tide and have a span of from 50 ft. to 60 ft. There will be several drawbridges in this section.

The distance from Homestead, the old terminus of the Florida



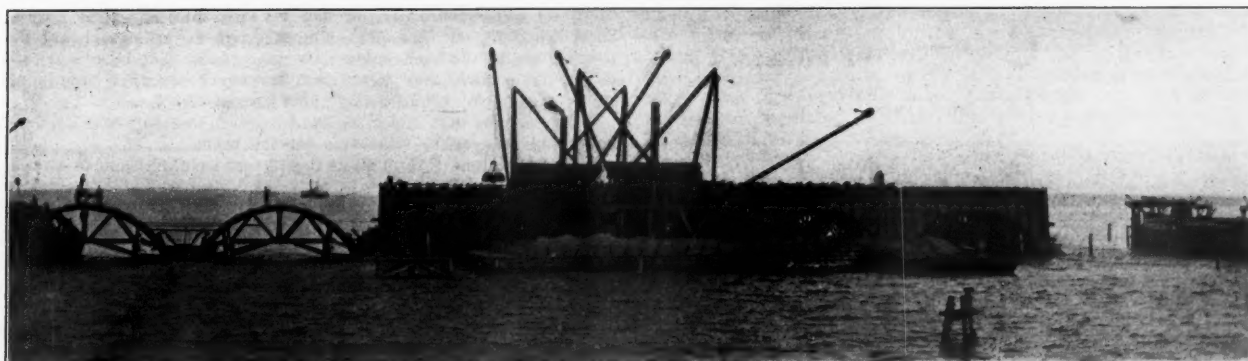
Hydraulic Dredge Throwing Up Embankment in Shallow Water.



East Coast, to Key West is 126 miles. Of this distance about 65 miles of the extension is built on solid ground on the keys. Of the remaining 60 miles nearly six miles will be concrete arches over deep water. The longest stretch is from Long key to Conch key, 10,500 ft. Knight's key channel is 7,300 ft., Moser key channel 7,800 ft., and Bahia Honda channel 4,950 ft. The openings between

ertia is constant from one section to the next. This moment of inertia is usually that at the center of  $\delta_s$ .

Assume that a certain arch ring has been decided upon and that its dimensions are known, including the span and rise of the arch axis. Divide the span into 20 equal parts and measure or compute the lengths of the axis having these equal divisions as



Long Key Viaduct under Construction; 184 Concrete Arches.

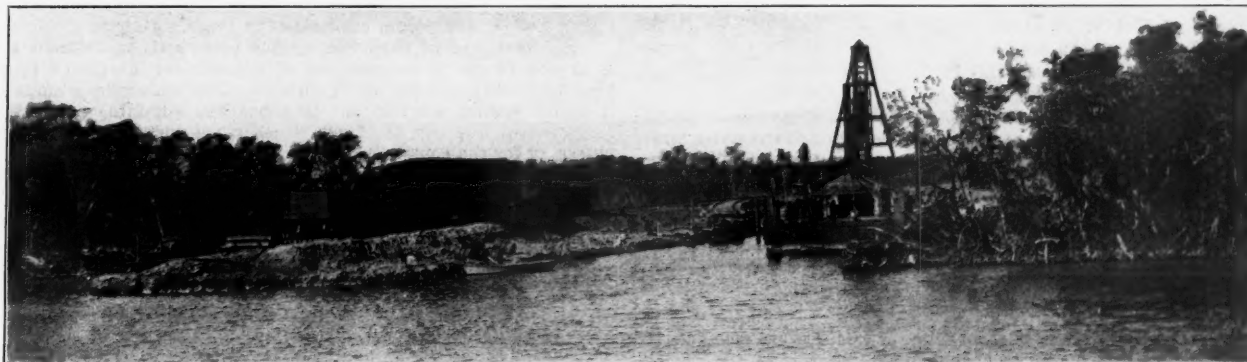
the keys will be closed by embankments where the water is shallow. These are thrown up by dredging and then rip rapped. Great difficulty has been experienced in reaching several of the small islands west of Big Pine key. The water between them is a series of rocky lagoons through which a channel had to be blasted to allow dredges and boats to get near the land.

A base of material supplies has been established at Knight's key, where a dock 600 ft. long by 175 ft. wide has been built with 19 ft. of water alongside. Sand, rock, cement and steel are stored there in enormous quantities. On Big Pine key a large tank has been built for storing water that was formerly carried on tank barges from Miami to the different camps. This reservoir holds over 1,000,000 gallons, being 90 ft. long, 40 ft. wide and 15 ft. deep.

The destructive tidal wave of last October which engulfed

horizontal projections. These lengths are designated  $\delta_{s_1}, \delta_{s_2}, \delta_{s_3}$ , etc. Bisect each of the 20 equal divisions of the span and through these points draw verticals until they intersect the axis of the arch. Beginning at the left number these points 1, 2, 3, ..., 10, and from the right 1' 2' 3' ..., 10'. Determine the co-ordinates  $x$  and  $y$  of each point referred to the left end of the span. Also compute the moment of inertia of the arch section at each point 1—1' inclusive. Then for vertical loading, neglecting the axial stress, the horizontal thrust is given by the formula

$$2 H_1 = \frac{\sum m_x \Delta \left( y - \frac{\sum y \Delta}{\sum \Delta} \right)}{\sum y \Delta \left( y - \frac{\sum y \Delta}{\sum \Delta} \right)}$$



End of Grade on Grassy Key; Florida East Coast's Key West Extension.

Elliott's key and other islands and drowned scores of workmen did little damage to the railroad construction work.

#### Symmetrical Masonry Arches—Coefficients for Reactions and Moments at the Supports.

BY MALVERD A. HOWE.

The elastic theory in designing masonry arches is coming into use with the introduction of concrete reinforced with steel. A thorough analysis of the stresses, however, is rarely made. This is probably due to a lack of familiarity with the methods or a lack of time, and, furthermore, because practical considerations do not make it feasible to design the arch ring to correspond to the maximum stresses at each section.

The application of the formulae based upon the elastic theory is very much more flexible than is generally supposed. The results obtained from a thorough analysis of a given arch ring can be used in designing a great number of other rings having quite different dimensions. The formulae in their integration form can rarely be employed owing to the shape of the arch axis and the variation in the moments of inertia. Summation formulae have been devised, while approximate, which are quite accurate for all practical purposes. The summation formulae assume that the arch ring is divided into a number of finite lengths  $\delta_s$ , sometimes equal but more often of unequal lengths, for which the moment of in-

Where  $H'$  = the horizontal thrust

$\Delta$  =  $\delta_s \div$  moment of inertia of section

$y$  = ordinate of points 1, 2, 3, etc.

$\Sigma$  = sum of factors for points 1—1' inclusive

$m_x$  = the common moment for the given loading on a beam supported at the ends plus the moment of an equal and symmetrical loading.

All quantities in the above expression with the exception of  $m_x$  are independent of the loading and consequently are constant for the given arch ring. Let  $y = fy'$  and  $\Delta = \Delta' \Delta_{10}$ , where  $f$  = the rise of the arch axis and  $\Delta_{10}$  = the value of  $\Delta$  at point 10, then,

$$2 H_1 = \frac{\sum m_x \Delta' \left( y' - \frac{\sum y' \Delta'}{\sum \Delta'} \right)}{f \sum y' \Delta' \left( y' - \frac{\sum y' \Delta'}{\sum \Delta'} \right)}$$

in which  $y'$  and  $\Delta'$  have fixed values relative to the rise of the arch axis which has been taken as unity and the value of  $\Delta$  at point 10 which has also been taken as unity, respectively. As long as the actual values of  $\Delta$  vary in the same manner as the values of  $\Delta'$  the value of  $H_1$  will remain unchanged. Consequently an infinite number of arch rings can be designed fulfilling this condition without changing the value of  $H_1$ . If the actual values of  $y$  vary as the values of  $y'$  then the value of  $H_1$  varies inversely as the actual rise of the arch axis. The two statements made above assume that the

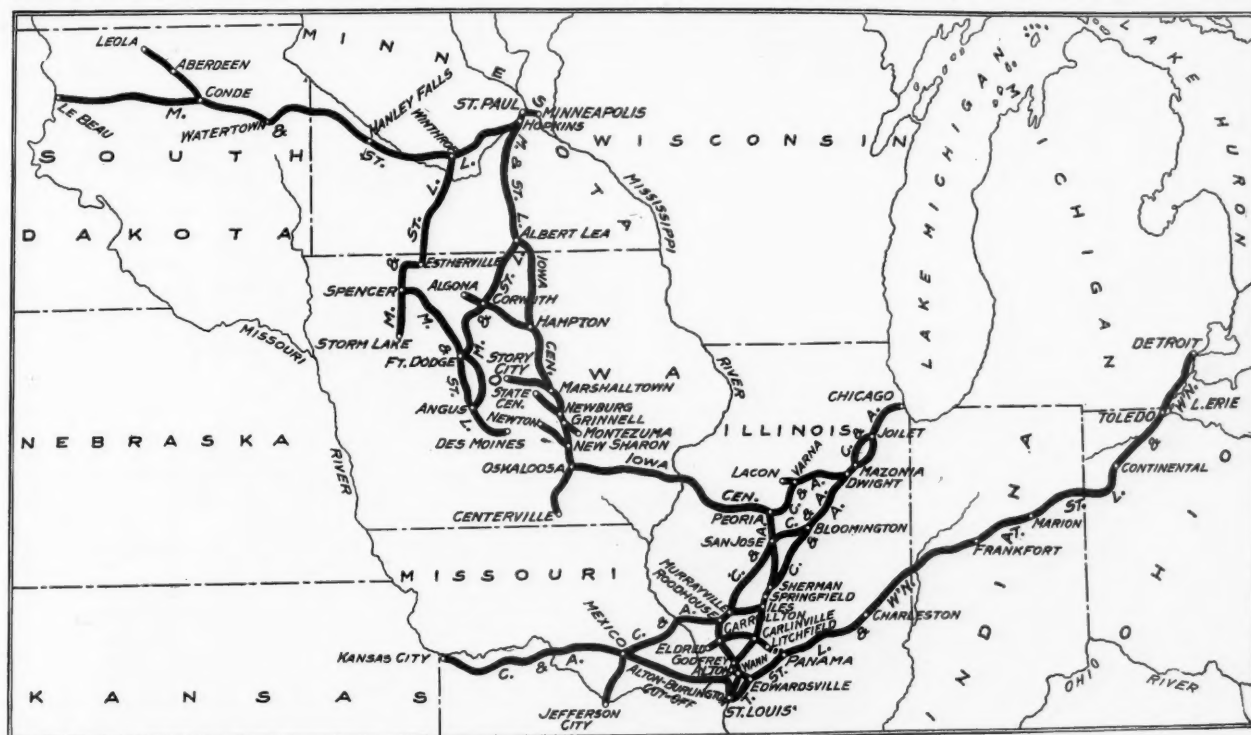




### The Sale of the Chicago & Alton to the Toledo, St. Louis & Western.

On August 23 it was announced that the Toledo, St. Louis & Western had acquired control of more than a majority of the capital stock of the Chicago & Alton. The controlling interests in the Toledo, St. Louis & Western also control the Iowa Central and the Minneapolis & St. Louis. The accompanying map, therefore, shows these four railroads and their relation to each other. The Colorado & Southern, which runs from Orin Junction, Wyo., south through Denver, Colo., to Fort Worth, Houston and Galveston, Tex., in which the same men are largely interested, is not included in the map. The Toledo, St. Louis & Western has 451 miles of line and gross earnings of \$4,200,000; the Chicago & Alton has 970 miles of line and

On May 13, 1899, a new railroad law was passed. This included all the good qualities of the earlier law, with certain amendments suggested by later experience, both at home and abroad. Railroad building was encouraged, as in the previous law, by subsidies and exemptions from taxes and duties for certain periods of years, while the operation of the roads was facilitated by permission to form pools, divide shipments and apportion business, by preventing the building of unnecessary parallel lines and by forbidding ticket scalping and all forms of rebates. At the same time the interests of the state were well cared for in the law by provisions whereby the actions of pools should be subject to approval of the government, which also has the power to regulate and adjust freight and passenger rates at intervals of three years, and to approve rates before they become operative. Further, the law lays down the rates to be



The Toledo, St. Louis & Western; Chicago & Alton; Iowa Central, and Minneapolis & St. Louis.

gross earnings of \$11,600,000. The Minneapolis & St. Louis has 800 miles of line and gross earnings of \$3,700,000, and the Iowa Central, 558 miles of line and gross earnings of \$3,000,000.

### The Railroads of Mexico.\*

BY ERDIS G. ROBINSON, C.E.

Formerly of the Engineering Department of the Mexican Central.

#### III.

##### RELATIONS BETWEEN GOVERNMENT AND RAILROADS.

Railroad development in Mexico as influenced by the laws of that country may be considered as having passed through several distinct periods. During the first there were no special inducements offered by the government to aid railroad construction and to attract capital. Nevertheless there were several roads planned and companies organized. There was ample confidence in the country and its industrial advancement. But, commercially, Mexico was new, business growth slow, distances great, and railroad construction difficult and costly; and with one exception these plans were not carried out. The only road built during this period was the Mexican Railway, from Vera Cruz to Mexico City, which was built to handle a well established business and therefore did not have to depend on future development.

In 1880 the government, realizing the necessity of railroad development to advance the prosperity of the whole country and being itself firmly established and at peace, enacted a law which provided for liberal subsidies, tariff and customs exemptions and governmental regulation of rates, life of concessions, charges for government business, etc. Thus early was inaugurated a policy which has since been followed consistently, whereby on the one hand railroad construction has been made easy for the companies, while on the other the rights and interests of the state have been carefully guarded. This law remained in force till 1900 and consequently most of the railroads have been built under it.

\*The first article was published in the *Railroad Gazette* of July 12, 1907; the second, in the issue of Aug. 9, 1907.

charged for government business and provides for free mail service; this last provision being very different from the custom of some countries of paying higher rates than other shippers. One of the most interesting features is that which provides that the railroad property, except rolling stock and similar appliances, shall pass to the possession of the government at the expiration of the life of each concession, which is limited to 99 years.

The modern tendency toward consolidation appeared in Mexico in due course of time, among the railroad companies. The Mexican Central, originally 1,224 miles long, had been increased from time to time by construction of branch lines and finally by purchase of smaller roads, to about 3,000 miles of line in 1903. At this time rumors were in the air to the effect that certain interests, allied with the Standard Oil Company, were acquiring control of the system and that there were to be further combinations. Certain facts, as for instance the fact that H. Clay Pierce was Chairman of the Board, tended to confirm this rumor. Now it happened that the company was making surveys and plans for construction of a short line to the United States with terminus at San Antonio, Tex. This line would not only tap the valuable coal lands of northeastern Mexico, but also would remove the handicap under which the road had carried on its through business of the long haul by way of El Paso, which it could avoid only by making traffic arrangements with the Mexican International. About this time the government stepped into the breach. By acquiring stock in the open market, it obtained control of the National of Mexico, the Mexican International and the Interoceanic, which were combined in one system, though still retaining in a way their separate organizations. The combined mileage of these roads very nearly equalled that of the Mexican Central. It then appeared that the Mexican Central would not be given a concession for a line to the United States as had been planned, crossing the Rio Grande between the lines of the National and International roads, as this privilege had been granted to these latter roads exclusively. This put a stop to the Central's aspirations for a short line connection, and, in the light of subsequent events, made more desirable the merger now under way of all these roads under government control.

It is not to be supposed that the government entered the railroad business merely to make money on its investment. Its object rather was to secure the prosperity of the country and guarantee its future against the arbitrary control of railroad corporations. It was not content to stop with what had been done. The difficulty encountered by the United States in its attempts to regulate the great railroad mergers did not pass unnoticed, nor did the fact that these efforts of the United States, though at times seeming to prevail, still in the end apparently put little hindrance in the way of railroad consolidations. The Mexican government felt that it was necessary to act before the railroads had become so powerful as to be invincible.

Hardly had the country become accustomed to the new order of things when, following later rumors as to the purchase of the Mexican Central by certain interests in the United States, it was announced in December, 1906, that the Mexican government had acquired a controlling interest in the securities of that road. By that act it became virtually supreme in the railroad field of the country, since it was the controlling influence in the three principal lines reaching the United States border, all the lines reaching the port of Tampico, the Inter-oceanic line from Mexico City to Vera Cruz, the road under construction to the Pacific port of Manzanillo, the railroad crossing the Isthmus of Tehuantepec and the road connecting this with the Vera Cruz lines. Thus has Mexico become inoculated with the germ of modern life that produces an irresistible desire for consolidating like industries, and is fighting the trust tendency with the trust style of warfare. There is this difference, however, that the motives of the government are unselfish, since its desire is to protect the interests of the nation, which means of the people of the country, and also to advance the value of the railroad properties.

This action of Mexico merits the careful attention of the rest of the world, and will call for the exercise of rare tact and wisdom on the part of the government's representatives. Probably the fact that Mexico is in reality a paternal or autocratic government will render more simple the working out of the problem. Following the first merger, the National Lines of Mexico, under governmental control, the railroads combined were still, in the details of their management, operated as separate companies, while their larger policies were influenced by the government control. Probably some policy of this kind will be followed now, with the government in control but advised by practical railroad managers.

A question that has entered vitally into the operation of the railroads of Mexico, and on which the government has shown a friendly attitude toward the roads, has been the fluctuating value of the silver peso as compared with the standard gold coins of other nations. It will be seen that this fluctuation works to the advantage or disadvantage of the railroads according as to whether they are spending money at home or abroad. The income of a road doing business in Mexico is received in the peso of that country. Certain items of operating expenses such as wages and taxes, are paid in the same coin. If these were all that entered into the problem the matter of money fluctuation would affect the prosperity of the railroad company in only an indirect way. But the railroads have other payments to make. They are financed on a gold bond basis the interest payments of which must be met in gold, and many supplies must be purchased in foreign countries where gold payments are required. It will be seen that for every 1,000,000 pesos of net earnings there will be a shrinkage of \$10,000 for every decline of one cent in the price of silver. In the early '90s there were declines in the peso of nearly 10 cents in a single year. This decline with a road earning 5,000,000 pesos would mean a shrinkage of \$500,000 in the fund to be applied to bond payments or foreign purchases.

There is, of course, another side to this question. In borrowing money abroad to be expended on works in Mexico, it is evident that money borrowed while silver is at a low price will buy a greater number of silver pesos and consequently cover more work, since wages and domestic supplies do not fluctuate with the value of silver.

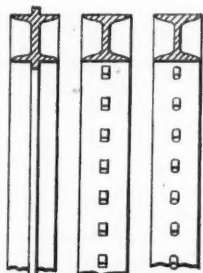
Expressed in figures the Mexican peso declined steadily in value from 83 cents in 1891 to 37 cents in 1902, and then rose again to a value of 50 cents in 1905. In this year the government, after a

most careful and extended study of the whole matter, inaugurated a monetary reform. It was the object of this measure to place the Mexican currency on a stable gold basis with the value of the peso fixed at 50 cents. Up to the present time the attempt has succeeded, as the value of the peso has fluctuated little from that fixed figure. This stability of exchange warrants confidence in values, encourages the investment of capital, and by making money transactions more dependable greatly increases the convenience of doing business.

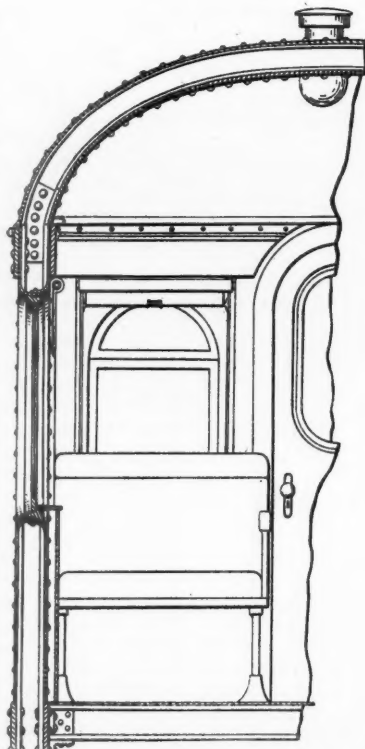
(To be continued.)

#### A New Pressed Steel Passenger Car.

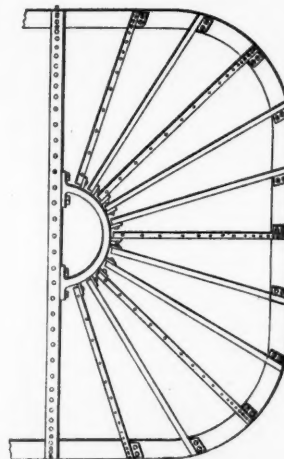
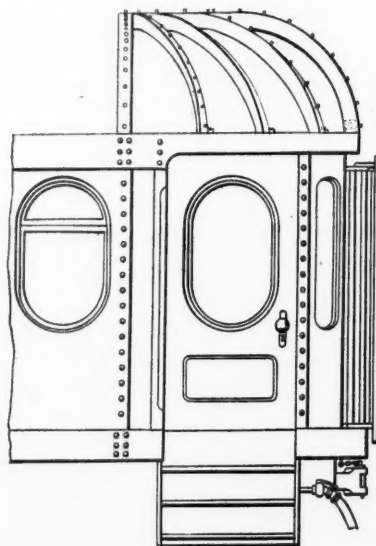
A patent has recently been issued to William G. Wagenhals, St. Louis, Mo., covering a design of steel passenger car built largely of pressed steel shapes. One of the accompanying photographs has been "doctored" to show the general appearance of a car built in this



Method of Forming Rivets on I-Beam Posts.



Half Cross Section Through Wagenhals's Pressed Steel Car.



Plan and Side Elevation of Vestibule Hood Framing.

way. The drawings show the principal details of construction on which the patent was allowed. Steel plates about  $\frac{1}{8}$  in. thick, of a length equal to the height of the side of the car and of sufficient width to give the window opening desired, are placed in a special press and the oval openings for the windows are punched in them. The plates are then placed in another flanging press and the edges of the openings are bent down to form a continuous flange. All the rivet holes in the flanges and along the vertical edges of the plate are punched at one time. These plates are then made up in pairs, one forming the outside wall and the other the inside wall of the car. The oval flange on the inside plate is made smaller than the flange on the outside plate so that the two flanges overlap and can be riveted together.

The framing of the car is made up of two side sill plates between which the vertical I-beam posts are riveted. These I-beam

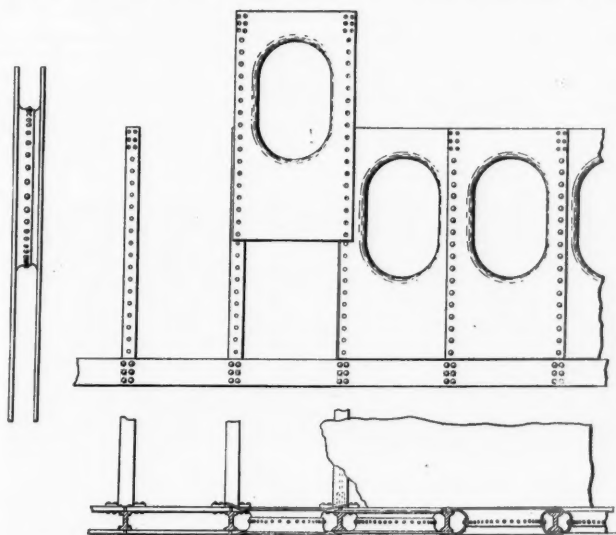


posts are rolled preferably from soft Norway iron suitable for riveting and are made with a projecting rib in the middle of each flange. By means of a special machine sections are cut out of these projecting ribs leaving square lugs which are afterwards rounded up into

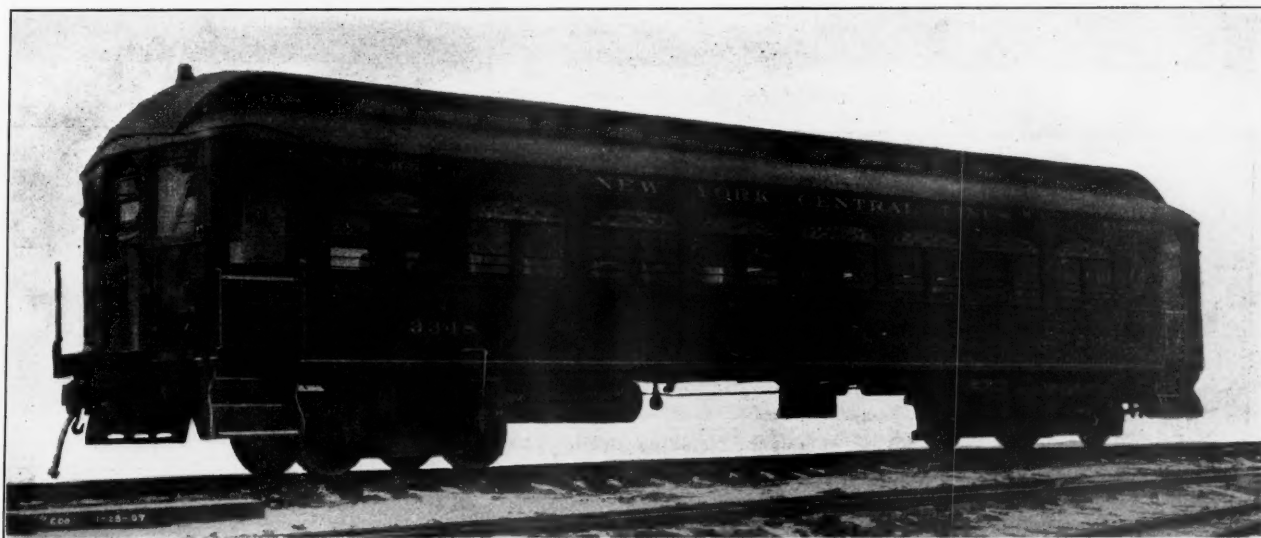
rivets spaced at intervals corresponding to the punching of the side plates. The frame having been assembled the double side plates are lowered into position over the posts, the edges having been sprung out to clear the projecting rivets on the posts. The plates are made to overlap each other and when assembled the edges are bent back over the rivets and the rivets headed up, securing both plates at one time.

After the sides are constructed, the roof beams are riveted in place. These roof beams are of the same construction as the side beams, except that they are curved to form an oval or turtle back roof, and are somewhat lighter in weight and size than the side beams as they are not required to carry any strain, except holding the roof and spacing the sides. The rivets on these roof beams are formed in the same way as in the side beams. The roof and ceiling plates are riveted to these roof beams, in the same way as the sides, the plates running entirely across the roof, and being in width about equal to the distance of four or five side sections. The outside plates are first riveted on and then the ceiling plates. Before riveting the roof plates in place, the letter board plates and transom plates are riveted in place at the top of the side plates. The roof plates overlap the upper edge of the letter board plate, and the edges are secured by a finish molding running longitudinally and screwed in place. The ceiling plates are riveted in place last of all, and the joint between the ceiling plates and this inside plate is concealed by a metal molding.

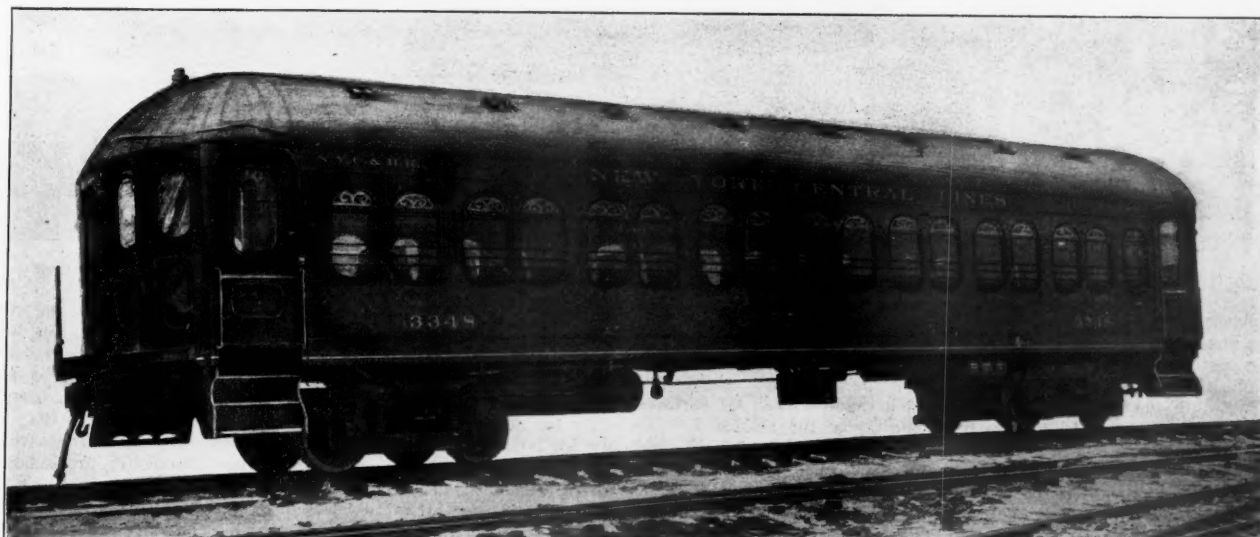
For the window frames, a framework of aluminum or brass to fit the opening formed as a window opening in the side plates is used. This frame will cover the rivet heads in the window section, and in it is mounted the stationary window and a movable window, which can be lowered to open by drawing in the lower end of the window sash and dropping it into the pocket between the seats.



Method of Assembling Side Plates and Riveting to Posts.



Steel Passenger Car for the New York Central, Built by the St. Louis Car Company.



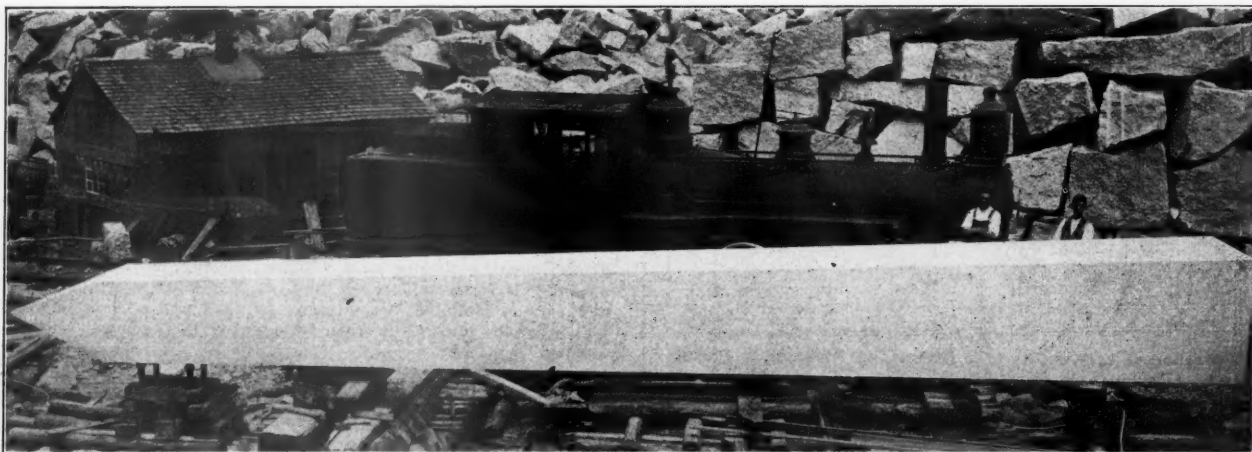
Wagenhals's Proposed Modification of Steel Passenger Car with Pressed Steel Side Plates and Curved Roof.

The sash for the windows are aluminum castings. The shade roller is mounted above the window on the inside of the car, in a metallic case, which case has extensions that reach to the bottom of the windows, and cover the rivet heads of the plate joints inside the car. They also have grooves on the inner sides to guide the curtain to the bottom of the window and to retain it in position.

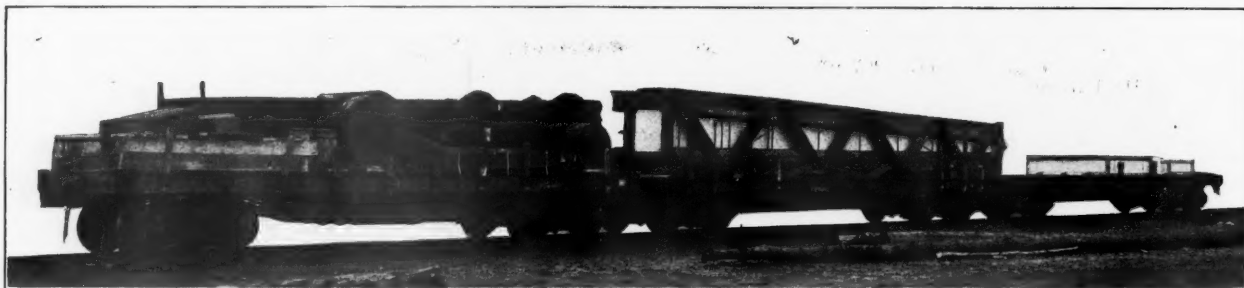
The construction of the ends of the car, the side walls of the vestibules, the door frames and the doors is the same as the construction for the sides of the car, but for the hoods over the vestibules a novel construction is provided. The last carline at each end of the car runs straight across from one side to the other, and to the middle of this carline is bolted a semi-circular casting of brass, steel or malleable iron, with lugs cast thereon extending out radially.

#### An Obelisk for Sault Ste Marie.

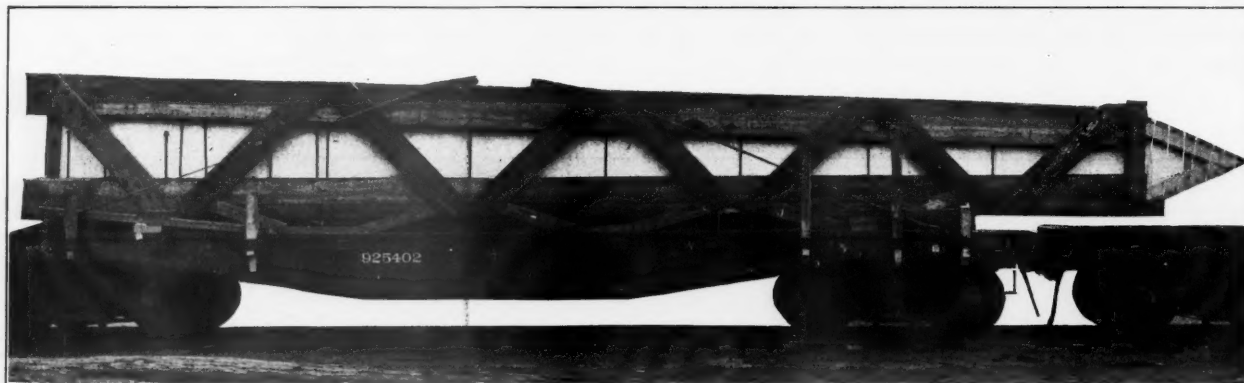
There was recently shipped from a quarry at Stony Creek, Conn., by The Norcross Brothers Company, general contractors, an obelisk which is to be erected in Locks Park, Sault Ste. Marie. The shaft is of hammered Stony Creek red granite, 5 ft. 5 in. square at the foot, tapering to 1 ft. square near the top and then finished to a point. It is 45 ft. long and is believed to be the longest shaft ever transported by rail in this country. The stone weighs about 60 tons. It was loaded on Pittsburg, Fort Wayne & Chicago car 931,701 and the bases on Pennsylvania Company car 92,540, the former of these cars being one generally used to transport heavy ordnance. As this car, which is 36 ft. long, was the longest car available, the



Obelisk for Sault Ste. Marie in the Quarry.



Whole Shipment, Including Obelisk, Bases and Machine.



Obelisk Loaded on Car.

Holes are cored in these wings or lugs and hood carlines bent to the shape of the roof required are bolted or riveted to the lugs of the casting and radiate therefrom to the edge beam of the roof to which they are secured by angle plates. The hood carlines are constructed in the same way as the side posts and main roof carlines with the rivets formed integrally on the top of the beams.

Instead of punching oval openings in the side plates for window openings, rectangular window spaces can be formed, and the flanges riveted together as in the case of the oval openings, but in such construction the corners of the flanges would have to be cut or severed, and the openings can then be covered by an ornamental molding forming part of the window frame. The oval construction, however, obviates the necessity of severing the flanges,

shaft was rested on a bed mounted on swivels to allow for the sway around curves. In loading the stone, it was jacked up to the level of the car; greased timbers similar to launching timbers for a ship put under it, and it was then smoothly and easily slid on the car without the use of any derrick. The accompanying photographs show the obelisk in the quarry before being loaded on the car; the obelisk boxed for shipment and loaded on the car and the three cars which made up the shipment; one containing the machine which was used to carry it at Sault Ste. Marie; the second the obelisk; and the third, the bases on which it is to rest. The shipment was made from Stony Creek, which is on the Shore Line division of the New York, New Haven & Hartford, west to Harlem river, and thence via the Star Union Line to its destination at Sault



Ste. Marie. The shipment left Stony Creek on July 16 and arrived at Sault Ste. Marie in good order on August 7.

The obelisk is being erected by the semi-centennial commission appointed two years ago to celebrate the opening of the first canal at Sault Ste. Marie.

#### Poor's Manual for 1907.

The advance sheets of the statistical tables from the 1907 edition of Poor's Manual, covering the year ended June 30, 1906, are at hand this year some two months earlier than usual.

The total length of railroads completed on Dec. 31, 1906, is given as 222,635 miles, as compared with 217,341 miles on Dec. 31, 1905; an increase for the year of 5,294 miles, while the increase of 1905 over 1904 was 4,947 miles. These figures, it will be observed, are for the calendar year; the balance of the statistics deal with the June 30 year. In the 12 months ended June 30, 1906, the southwestern group of states, embracing Missouri, Arkansas, Texas, Kansas, Colorado, New Mexico, Indian Territory and Oklahoma, built the most mileage, as in 1903, 1904 and 1905, the total for this group being 1,433 miles of new construction, as compared with 1,140 miles in 1905, 1,716 miles in 1904, and 1,892 miles in 1903. The northwestern group stands next, with 1,099 miles; then the Pacific group, with 919. Texas has a long lead among the individual states, with the surprising record of 667 miles, as compared with 337 in 1905. Louisiana, with 323 miles, is second, and South Dakota, 309 miles, third. The new mileage in Texas is little short of the sum of new construction in the 11 states making up the middle and central northern group. New Hampshire, Vermont, Rhode Island, Connecticut, Delaware and Iowa built no new mileage.

Traffic earnings: Passenger.	\$521,231,337	\$486,420,902
Freight .....	1,659,925,643	1,478,167,246
Miscellaneous .....	165,483,306	147,609,622
Total .....	\$2,346,640,286	\$2,112,197,770
Net earnings .....	790,187,712	685,464,488
Other receipts .....	100,292,369	80,927,659
Total available revenue..	\$890,480,081	\$766,392,147

Payments.		
Taxes .....	\$68,169,833	\$54,553,620
Interest on bonds .....	269,926,395	247,155,897
Other interest .....	13,107,169	12,956,346
Dividends on stock .....	225,601,245	193,753,869
Miscellaneous .....	79,806,024	59,856,679
Rentals—Interest .....	39,612,179	31,716,773
Dividends .....	27,739,680	22,314,069
Miscellaneous .....	15,042,783	22,208,880
Total payments .....	\$739,005,308	\$644,516,133
Surplus .....	151,474,773	121,876,014

The following statistics of track mileage and rolling stock equipment are also important:

#### Statistics of Track Mileage and Rolling Stock Equipment.

Year.	Miles		Per ct. of total.	Loco-motives.	Passenger-mail.	Revenue cars		Freight.	Total.
	Steel.	Iron.				Baggage.	exp.		
1896.	210,290	28,440	238,730	88.1	36,388	24,940	7,880	1,245,640	1,278,460
1897.	215,658	26,043	241,701	89.2	36,410	25,654	8,180	1,234,972	1,268,806
1898.	220,804	24,435	245,239	90.0	36,746	25,844	8,049	1,284,807	1,318,700
1899.	228,976	21,387	250,363	91.5	37,245	26,184	8,121	1,328,084	1,362,389
1900.	238,464	19,389	257,853	92.4	38,065	26,786	8,209	1,350,258	1,385,253
1901.	246,811	19,181	265,992	92.7	39,729	27,144	8,667	1,409,472	1,445,283
1902.	257,437	17,398	274,835	93.6	41,636	27,364	9,726	1,503,949	1,541,039
1903.	271,013	15,249	286,262	94.6	44,529	28,648	10,182	1,624,150	1,662,980
1904.	282,229	11,708	293,937	96.0	47,344	29,205	10,417	1,691,421	1,731,049
1905.	289,109	10,803	299,912	96.3	49,616	30,777	10,552	1,757,105	1,798,434
1906.	297,378	9,265	306,643	96.8	55,439	32,896	12,295	1,979,667	2,025,858

The next tables show statistics of passenger and freight traffic for a series of years.

Year.	Length of R.R.s. in operation, miles.	Miles run by passenger trains, miles.	Passenger traffic.		Gross amount.	Passenger earnings—Average receipts		Per mile of road, cents.	Ave. No. passenger-miles of railroad.	Ave. No. passenger-train-miles.	Average distance traveled per passenger, miles.
			No. passengers carried.	Passenger movement, miles.		Per passenger, cents.	Per train-mile, cents.				
1902.	196,648	403,213,172	655,130,236	19,706,908,785	396,513,412	2.012	60.52	98.34	3,331	48.87	30.08
1903.	203,910	430,378,153	696,908,994	20,895,375,853	428,713,109	2.052	61.52	99.61	3,418	48.55	29.98
1904.	210,352	446,890,386	719,173,676	22,108,484,473	455,062,675	2.058	63.46	101.85	3,313	49.46	30.74
1905.	213,635	467,270,447	745,446,641	23,906,420,668	484,929,076	2.028	65.05	103.77	3,489	51.16	32.06
1906.	218,476	488,554,209	815,774,118	25,842,462,029	510,826,434	2.011	63.73	106.40	3,374	52.89	31.67

Year.	Length of R.R.s. in operation, miles.	Miles run by freight trains, miles.	Freight traffic.		Gross amount.	Freight earnings—Average receipts		Per mile of R.R., cents.	Per mile of railroad.	Miles per freight train mile.	Ave. haul, per ton, miles.
			Freight carried, tons.	Freight movement, miles.		Per ton, cents.	Per train-mile, cents.				
1902.	197,381	508,210,140	1,192,136,510	156,624,166,024	\$1,197,212,452	0.764	100.43	235.57	6,065	6,041	131.38
1903.	204,668	545,026,459	1,299,684,081	171,290,310,685	1,337,706,616	0.781	102.93	245.35	6,536	6,350	131.79
1904.	211,233	542,084,037	1,273,077,475	172,613,027,474	1,370,298,438	0.793	107.63	252.78	6,487	6,026	135.58
1905.	214,836	559,434,683	1,435,321,748	187,375,621,537	1,469,518,157	0.784	102.38	262.67	6,840	6,681	130.45
1906.	220,688	608,324,539	1,610,099,829	216,653,795,696	1,659,925,643	0.766	103.08	272.87	7,521	7,295	134.55

Gross and net earnings, interest and dividends, have been as follows:

Years.	Earnings		Total available revenue.	Payments from available revenue.		Earnings, per mile of R.R.		Expenses to earnings.	Int. paid—on total bonded debt.	Dividends paid—on total share capital.
	Gross.	Net.		Int. on bonds.	Dividends.	Gross.	Net.			
1902.	\$1,720,814,900	\$560,026,277	\$635,269,592	\$263,237,451	\$178,200,752	\$8.696	\$2,830	67.45	4.09	2.93
1903.	1,908,857,826	592,508,512	681,993,996	278,101,828	190,674,415	9.301	2,887	68.96	4.17	3.03
1904.	1,977,638,713	639,240,027	720,597,918	275,800,200	211,640,227	9.248	2,989	67.08	4.01	3.31
1905.	2,112,197,770	685,464,488	766,392,147	270,315,290	203,675,622	9.643	3,129	67.54	3.70	3.27
1906.	2,346,640,286	790,187,712	890,480,081	309,538,574	253,340,925	10.631	3,580	66.33	3.99	3.63

The following table gives principal statistics for the 1906 and 1905 fiscal years:

	1906.	1905.
Mileage of railroads.	218,433.46	214,044.24
Second track, sidings, etc.	88,569.48	85,867.45
Total track .....	307,002.94	299,911.69
Steel rails in track .....	297,378.15	289,160.18
Iron rails in track .....	9,624.13	10,802.51
Locomotives .....	No. 55,439	No. 49,616
Cars: Passenger .....	83,896	30,777
Passenger, mail, etc. ....	12,295	10,552
Freight .....	1,979,667	1,757,103
Total revenue cars .....	2,025,858	1,798,434
Liabilities.		
Capital stock .....	\$7,106,408,976	\$6,741,956,825
Bonded debt .....	8,487,139,981	7,821,243,106
Unfunded debt .....	210,538,466	201,578,773
Current accounts .....	722,023,502	620,720,096
Sinking and other funds. .	242,256,471	182,853,229
Total liabilities .....	\$16,768,367,396	\$15,568,752,029
Excess of assets .....	686,919,232	650,821,816
Total .....	\$17,455,286,628	\$16,219,573,845
Assets.		
Cost of railroads and equip.	\$12,719,736,342	\$12,143,997,551
Other investments .....	3,305,782,328	2,935,276,877
Sundry assets .....	488,368,638	367,454,847
Current accounts .....	941,399,320	772,844,570
Total assets .....	\$17,455,286,628	\$16,219,573,845
Miles of railroad operated.		
Revenue train mileage:	Miles.	Miles.
Passenger .....	488,554,209	467,270,447
Freight .....	608,324,539	559,434,683
Mixed .....	27,711,651	26,715,494
Total .....	1,124,590,399	1,053,420,624
Passengers carried .....	815,774,118	745,446,641
Passenger mileage .....	25,842,462,029	23,906,420,668
Tons freight moved .....	1,610,099,829	1,435,321,748
Freight mileage .....	216,653,795,696	187,375,621,537

The concluding table shows mileage, capital stock, bonded debt, and cost, total and per mile.

Year.	Miles of railroad.	Capital stock.		Bonded debt.		Total stock, mort. bonds, equipment obligations, etc.*	
		Total.	Per mile.	Total.	Per mile.	Total.	Per mile.
1901.	195,887	5,978,796,240	30,521	6,035,469,741	30,811	12,326,491,526	62,926
1902.	199,685	6,078,290,596	30,439	6,465,290,839	32,377	12,553,927,302	64,371
1903.	206,886	6,355,207,335	30,719	6,722,216,517	32,494	13,525,623,300	65,380
1904.	211,074	6,477,045,374	30,686	6,908,799,403	32,731	14,081,756,366	66,715
1905.	214,044	6,741,956,825	31,497	7,425,261,901	34,690	14,563,199,931	68,028
1906.	218,433	7,106,408,976	32,533	7,851,107,778	35,942	15,593,548,957	71,388

\*Representing approximately cost of road and equipment.

#### Foreign Railroad Notes.

The Russian Minister of Railways has, according to press despatches, submitted to the Council of Ministers a scheme for improvements in the state railroads, which it is proposed to carry out during 1908-1912. The total estimated expenditure is \$458,000,000, divided among five annual budgets. The principal items are: Double tracking, \$46,000,000; bridges and embankments, \$30,000,000; stations, \$59,500,000; work-shops, \$52,000,000; new rails, \$30,000,000; cars and engines, \$151,000,000.

The Austrian authorities are having a survey made of the streams available for water power in the mountainous parts of the country, with a view to their utilization for railroad motive power. The Railroad Minister declares that electricity should be used for large parts of the Arlberg Railroad, on the new Alpine railroads, and in all the long tunnels.

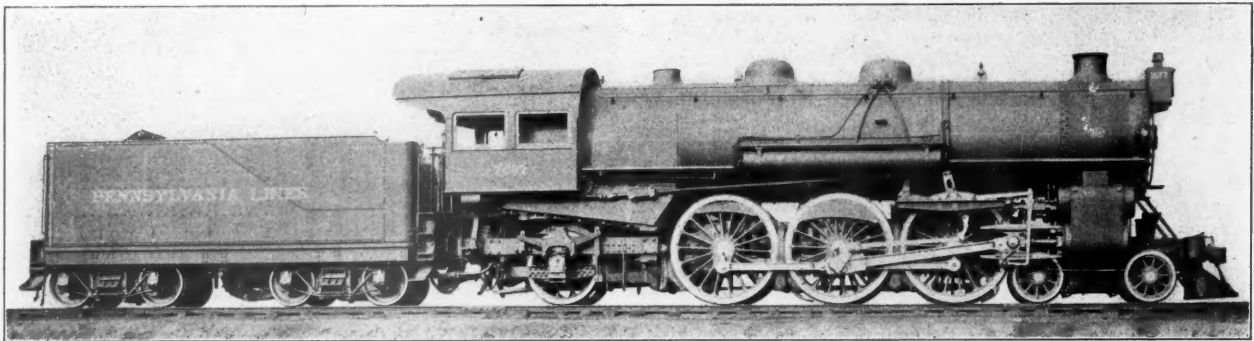
The Finance Minister of Argentina, in his budget for the year 1908, says that the government will henceforth leave the construc-

tion of new railroads to private parties, and he proposes the annulment of several laws looking to the construction of railroads by the state. This recommendation, if carried out, will make a difference of \$50,000,000 in the future national expenditures. The state owns about 1,700 miles of railroad, but there has been much waste of money in the construction of these lines and only one of them returns any interest on its cost. The Central Northern Railway, a state owned railroad extending toward Bolivia, will be completed to the frontier of that country by the end of this year, and the Argentine government, under a contract with Bolivia, will extend the railroad to Potosi.

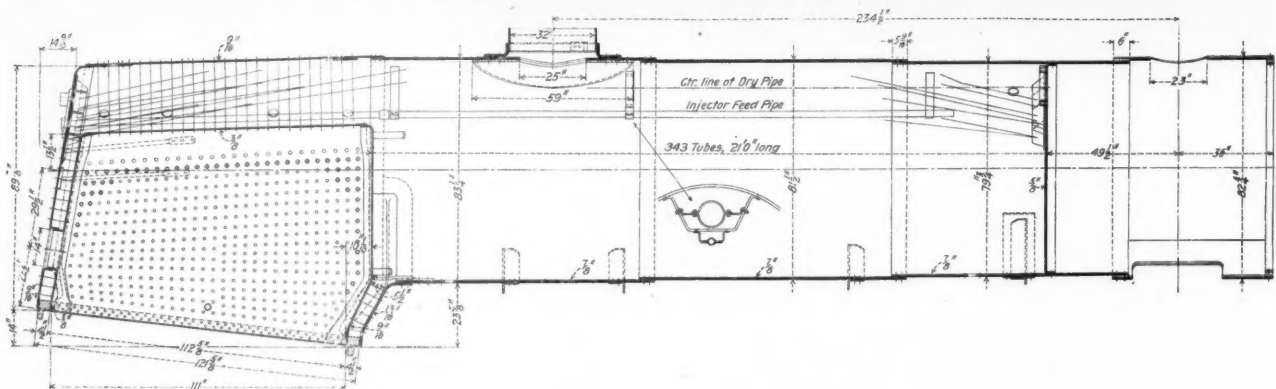
The Chinese Eastern Railroad runs from the junction with the Vladivostok main line at Harbin southwesterly to Port Arthur.

#### Pacific Locomotive for the Pennsylvania Lines West.

The American Locomotive Company has recently built a Pacific (4-6-2) locomotive for the Pennsylvania Lines West which is the heaviest passenger engine that has been built up to the present time for any road. The cylinders have a diameter of 24 in. and a piston stroke of 26 in. and can develop a tractive power of 31,000 lbs. This is about 22 per cent. more than that developed by the E-3d Atlantic engines of the same road. The introduction of the type was due to the demands of the traffic department for the movement of trains of greater weight, and because these demands could not be met without raising the weight on drivers on Atlantic engines above that which was considered safe. The Pacific type was therefore a necessity, if the weights on the driving wheels were



The Heaviest Passenger Locomotive; Pennsylvania Lines West.



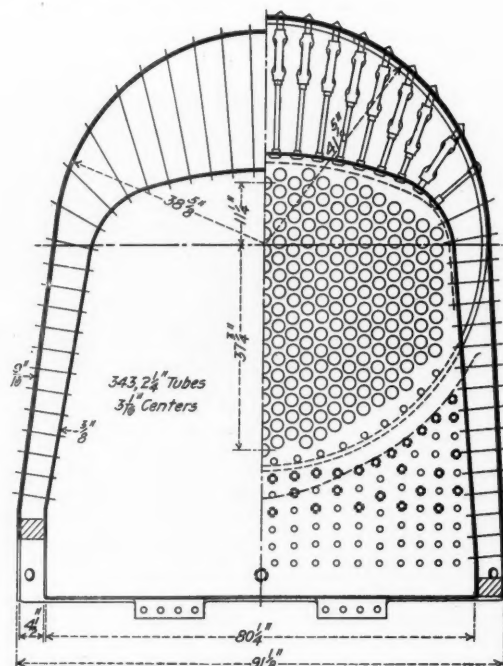
Boiler of Pacific Locomotive; Pennsylvania Lines West.

with connections to Pekin. It seems that since the war a gap of eight miles has been left between the northern section, controlled by the Russians, and the southern, which the Japanese manage. The through passenger from Europe to China must make this part of the journey on a Chinese cart or a Russian vehicle, either much less comfortable than a sleeping car. The passage is not made after dark, for fear of brigands. It takes from 80 to 96 hours to go from Harbin to Pekin, with several changes of cars.

The Shantung Railroad (German) has made its report for the year 1906. It was opened for through business on June 1, 1904. The gross earnings of the 271 miles of railroad were \$4,002 per mile in 1906, which is 13 1/2 per cent. more than in 1905. The working expenses increased but a trifle, and were but 36 per cent. of gross earnings; so that the net earnings per mile were \$2,561 in 1906, against \$1,836 in 1905. A dividend of 4 1/4 per cent. was paid. The traffic increased, but was by no means large, 846,840 passengers and 420,814 tons of freight having been carried, 228,663 tons of which were coal.

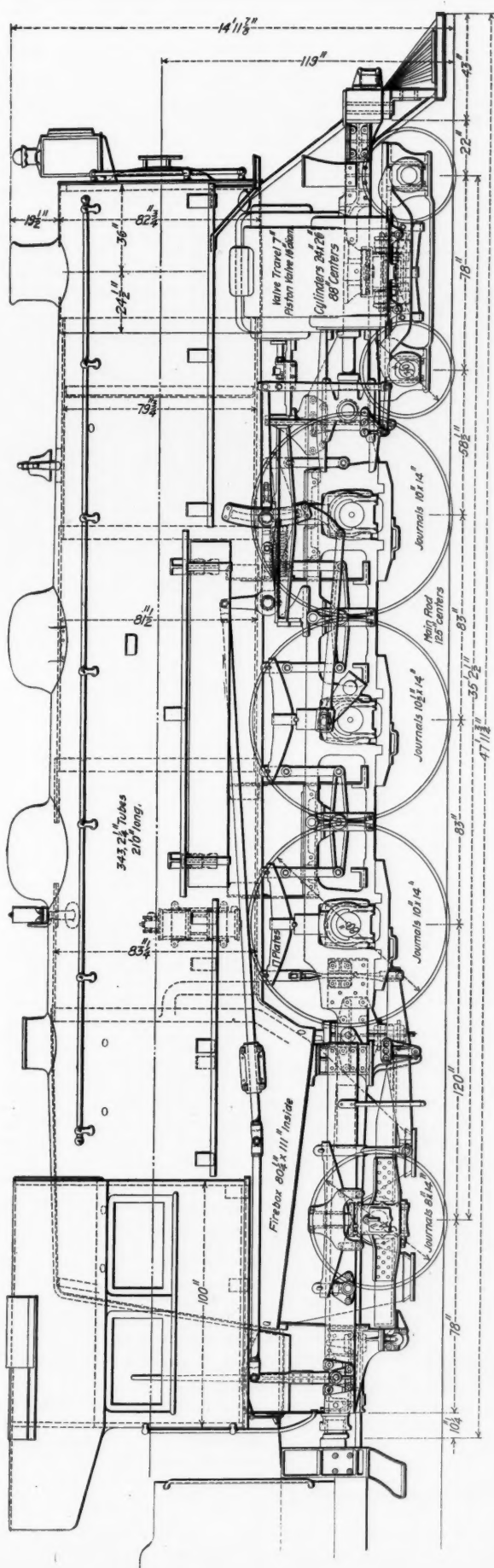
A plan has been worked out for the operation by electricity of the state railroads of Sweden. Power is to be generated at five water falls, the Karse, the Trollhätta, the Motala, the Hammarby and the Elfkarleby. Based on the requirements for 1905, the installation of the central power stations and the transmission lines would cost \$16,400,000. The yearly operating expenses, including administration, are estimated at \$1,578,000, as against \$1,700,000 at present, a saving of \$122,000. Single-phase current is to be used. The scheme will affect the operation of 1,240 miles of road and is the most extensive that has yet been proposed in Sweden.

The British Government is to build 400 miles of railroad in Nigeria, Northern Africa.



Section of Boiler at Firebox.

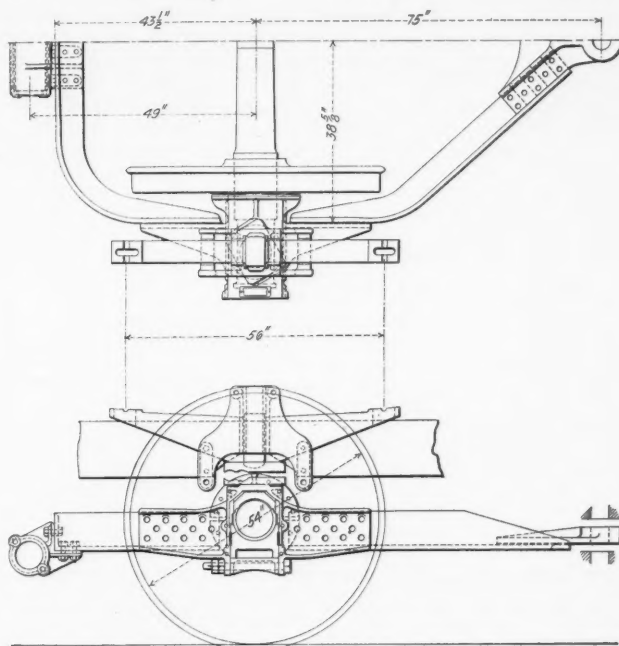




General Elevation; Pacific Locomotive for Pennsylvania Lines West.

to be kept below 60,000 lbs. per axle. As it is this maximum is closely approached for, on the main drivers, it is 59,000 lbs., which is close to the upper limits.

Comparing this locomotive with the Atlantic E-3d type, which is used for heavy high-speed service, it has cylinders 22 in. in diameter and 26 in. stroke, or an excess of 35 per cent. in cylinder capacity. Cylinder capacity, however, avails but little unless there is a corresponding steaming capacity to supply it. In this case the total heating surface is 4,427 sq. ft. for the Pacific as compared with 2,640 sq. ft. for the Atlantic. This marked increase is obtained by lengthening the tubes from 15 ft. to 21 ft.; increasing their number from 315 to 343, and for this extra length a diameter of  $2\frac{1}{4}$  in. was used instead of 2 in. This required a larger shell, which has accordingly been made  $79\frac{3}{4}$  in. in diameter instead of 65 in. on the smaller engines. The boiler presents no striking features of construction aside from its size and the fact that it is a departure from the standard Belpaire firebox that has been in use on the Pennsylvania for all classes of equipment. The steam pressure is 210 lbs. This combination of large diameters and high pressure involves somewhat heavier sheets than are ordinarily used, and the thickness has accordingly been increased to  $\frac{3}{8}$  in. for the whole shell, or  $\frac{1}{16}$  in. more than the sheets ordinarily used on boilers of smaller diameter. The roof sheet and the back tubesheet are each  $\frac{1}{16}$  in. thick, and the front tubesheet is  $\frac{5}{16}$  in. The staybolt spacing is  $3\frac{3}{4}$  in. and bolts 1 in. in diameter are used. The flexible stays are carried down on the front and back rows to within four



Trailing Truck; Pacific Locomotive for the Pennsylvania Lines West.

and six bolts from the foundation ring respectively, and then across the top row with a cluster in the upper corners. Sling stays are not used for the crown, but in their place are bolts whose length and tension is adjusted by a turn buckle.

For this great amount of heating surface a large grate is essential, and the one used has an area of 61.8 sq. ft. Its length is 9 ft. 4 in., with a width of 6 ft.  $8\frac{1}{4}$  in. between the plates. This is undoubtedly ample for the heating surface, but the question of firing so large a grate with the engine hauling a heavy passenger train at high speed will probably prove a tax on physical endurance, for at a rate of combustion of only 100 lbs. of fuel per square foot of grate per hour, it will involve the handling of more than three tons of coal in that time.

Owing to the large diameter of the shell and the height of its center (9 ft. 7 in.) above the rail, the dome must be low. It is 32 in. inside diameter and the opening is strengthened by a stiffening plate  $\frac{3}{4}$  in. thick to which is added a 1-in. dome base. In the shell the circumferential seams are double riveted, and the horizontal seams are of the usual sextuple riveted type with inside and outside welts. At the front the forward course is extended to form the rear end of the smokebox, and reaches out 29 in. beyond the front tubesheet. This is not common practice, as it is usually unnecessary to use as heavy a sheet for the smokebox as for the shell; but the length and weight of this boiler has rendered such a construction advisable.

The tubes are placed in vertical rows and are spaced on  $3\frac{7}{16}$  in.



# GENERAL NEWS SECTION

## NOTES.

The enginehouse of the Buffalo, Rochester & Pittsburgh, at Rochester, N. Y., was destroyed by fire on August 24, and 14 locomotives were badly damaged. The fire started from the explosion of a crude-oil apparatus used in firing up engines.

A press despatch from Atlanta dated August 21, says that the Governor of Georgia has suspended from office Railroad Commissioner Joseph M. Brown and appointed in his place A. G. McLendon. The order cites the law authorizing the Governor to take such action but gives no reason for the suspension.

In the United States District Court at Minneapolis, August 23, the Chicago, St. Paul, Minneapolis & Omaha was fined \$20,000 and its former General Freight Agent, H. M. Pearce, \$2,000 for granting rebates to the Spencer Grain Company. The jury in this case returned a verdict of guilty on April 11.

A press despatch from Omaha says that on account of the scarcity of help, the Union Pacific has had to greatly curtail work in its coal mines and is buying coal in Illinois for which it pays \$1 a ton. The estimated cost of this coal after carrying it to Utah is \$8 a ton. The Southern Pacific has ordered coal from Australia. Japanese miners in Wyoming are drawing as high as \$170 a month.

The railroads of Missouri have notified the Attorney General of that state that henceforth they will carry 150 lbs. of baggage free for each first-class passenger. It appears that under the new law recently passed, the railroads were allowed to charge for the transportation of all baggage over 100 lbs. for each passenger, but the Attorney General has induced the roads to restore the old arrangement.

The Board of Conciliation appointed to adjust the controversy between the Grand Trunk Railway and its locomotive engineers, reports that a settlement has been reached and an agreement signed for three years from Aug. 1, 1907, giving a substantial increase of wages. This is the second important dispute between the Grand Trunk and its employees which has been settled under the Canadian industrial disputes act.

The Chicago, Burlington & Quincy has issued a circular announcing that all lands and buildings owned by the company and occupied by others must be paid for at a reasonable rental. It appears that the Burlington, like some other roads, has granted the use of its property at many places, to shippers and others at nominal rentals. Henceforth applications for leases must be referred to an executive officer of the company.

Complaint has been made to the New York State Public Service Commission at Albany of the Pullman parlor car fare between Buffalo and New York, which is \$2, having been advanced from \$1.50. The complainant says that between Chicago and Minneapolis, about the same distance, the charge is only \$1. He also calls attention to the fact that in Wisconsin the Legislature has passed a law requiring upper berths in sleeping cars to be kept closed when not actually occupied.

The New York State Shippers' Protective Association, consisting of about 100 shippers in the central part of the state, has asked the Public Service Commission to require the railroads to give them adequate service and proper treatment. They want suitable cars to carry perishable products in the winter; want a full supply of cars at all times; want all agents to give through rates; want damage claims settled promptly, and want the railroad to be as fair to them as to itself in fixing demurrage charges.

The Wisconsin State Railroad Commission, deciding a complaint made by Nicholas Streveler, holds that the Marathon County Railroad, known as a "logging road," is a common carrier. In some cases passengers were carried free, as were many less-than-carload lots of lumber. The company published no tariff. The road is owned by the Connor Lumber Co., of Marshfield, and W. D. Connor, Lieutenant-Governor and chairman of the Republican State Central Committee, is its chief owner. The Commission held that the rates on lumber were extortionate and ordered them reduced from \$5 and \$7 a car to \$3.50 and \$4.50 a car; and, finally, "The carload business is

charged with the additional expense of conducting the less-than-carload and passenger business, which is unlawful, inequitable and socially and economically parasitic."

The Chicago, Milwaukee & St. Paul has appealed to the Circuit Court of Dane county from the Wisconsin Railroad Commission's order directing the company to place its terminal facilities at the disposal of a competing road. The state institute for the blind, a mile and a half south of Janesville on the Milwaukee road, wanted the St. Paul to switch to the sidetracks at the institution cars from the North-Western road; and the Commission, despite vigorous protest by the company, held that one road must switch the cars of another at a reasonable switching charge.

## The Grave Danger from Tramps.

The startling explosion of nitroglycerine by a tramp ejected from a freight train at Ridgway, Pa., will alarm every traveler and every train hand. There is grave neglect in this matter by the state. The tramp is always a trespasser. He is most of the time a criminal. Every ride he steals is theft. There is not a county in the state along the main line of any leading railroad where the country roads are safe to women. Yet the state does nothing to suppress this chronic piracy. It shifts on railroad corporations the public duty of keeping the peace. There is no more justice in this than for a city to make a householder police his front door and back yard. Train hands go in peril of life. Every state should meet this by a state police and make every mile of track secure. Men at their honest work ought not to have to put up a fight for life, as train hands daily do. The mere increase of property value due to safety would pay for such a state police.—*Philadelphia Press*.

On the Baltimore & Ohio last year there were 2,617 arrests for "ride stealing," most of which were followed by no punishment. The 900 vagrants arrested for trespassing on the Pennsylvania Railroad last year constituted but a small proportion of the total number constantly traveling over the road. In a single recent month 300 tramps were arrested by Pennsylvania Railroad police. A representative of that road says: What is going to be done about it? The railroads are willing to do their part in the way of furnishing police if they can have some assurance that offenders will be properly punished after they are arrested. Strict vagrancy laws strictly enforced will provide a remedy. Small localities can ill afford to bear the expense of keeping in prison a tramp that happens to drop off a passing railroad train. It is largely this matter of expense that prevents vagrants from being punished. If the state would undertake the punishment of vagrants, town and county officers would much more readily co-operate with railroads in putting an end to the really serious state of affairs.

## Railroad Building in the Lewiston, Idaho, District.

An era of competition for the immense grain traffic of the Pacific Northwest has begun in the Lewiston, Idaho, country, the result of which may make Lewiston one of the most important inland railroad centers west of the Rockies. The Union Pacific, it is said, has the route for a line through the Rocky mountains from Butte, Mont., via Lewiston to the Pacific coast located. From Lewiston east to Kooskia the line has been surveyed for a year and is ready for construction. It has been decided to run the line up the Selway fork, through the Nez Perces pass and thence to Butte.

The Oregon, Washington & Idaho, building from Lewiston to Riparia, Wash., is to be finished in a few months; the officials say the line is to be opened January 1. This line, being built jointly by the Northern Pacific and the Oregon Railroad & Navigation Co., will connect with the latter's road at Riparia, giving a direct, all-rail route from Lewiston to Portland. Work is under way on a line for the Oregon Railroad & Navigation Co. along the upper Snake river, and work on the Lewiston end is to begin this fall. The line is projected from Huntington to Lewiston, connecting at that place with the new Riparia line and thus on to Portland. The probable intention of the company is to route both freight and passenger traffic over the new line, thus avoiding the heavy grades and sharp curves over the Blue mountains, beside getting a water grade to the coast.

The Chicago & North-Western is reported to be planning to reach



Puget Sound via the Lewiston country waterways by building an extension via St. Anthony, Idaho. Though permanent surveys have not been made, it is understood that the line will pass down the Salmon, Snake and Columbia rivers to the sound.

Another railroad, the Chicago, Burlington & Quincy, has for several years planned to take advantage of the easy water grade via the Lewiston district to reach coast terminals. The road now reaches Billings, Mont., and the proposed extension will probably be down the Middle Fork and Clearwater rivers to Lewiston.

The proposed electric lines to be built include the Lewiston & Southeastern, which will open up the country from Lewiston southeast to Grangeville. Work is to be begun within 90 days and will be rushed to completion.

The Spokane & Inland Empire is building an electric line from Spokane south to Lewiston, 115 miles, with a parallel line on the west leaving the first line at Spring Valley Junction, Wash., to a connection with the same line at Moscow, 65 miles. The east line has been finished to Moscow, 50 miles south of Spring Valley Junction, and the west line to Colfax, 36 miles south of the junction. Early next year the remaining link is to be built. The line will carry large quantities of grain through Lewiston that now pass through Spokane, and through a traffic arrangement furnish an entrance for the Canadian Pacific into Lewiston.

A third interurban line is to enter Lewiston from the southwest, being projected from Walla Walla, Wash., by way of Pomeroy. Construction may begin next year.

The project of the government to open the Columbia river to navigation by building a canal around Celilo rapids, the only portion of the entire distance between Lewiston and the coast that is not navigable, for which large sums of money have been appropriated, is likely to come within the next decade.

#### Union Pacific Gasolene Motor Test.

As an endurance test, on August 22, Union Pacific motor car No. 12 was run from Omaha to Denver in 16 hrs. 34 min., running as the second section of No. 1, the Overland Limited, Omaha to Julesburg. The running time of the regular Denver fast train is 17 hrs. 15 min. The distance run was 570 miles, making the speed of the motor about 34½ miles an hour, a very satisfactory long distance test. The motor cars now in service at Denver have been making 172 miles a day, and have been on time constantly. The company is building 18 additional cars.

#### A Railroad Journey from Peking to Hankow.

The Peking-Hankow Railroad from Peking to Hankow, opened at the beginning of this year, is 800 miles long and passes through continuous plains of rice fields, stretching as far as the eye can reach on either side of the railroad. Generally the water is pumped up by hand from the river to the highest level and then led down in bamboo pipes to the various terraces on which the rice is growing.

About half way on the journey the train crosses the Yellow river on a bridge a mile and a quarter long. The train proceeds at a very slow speed, as the oscillation is considerable and the Chinese engineers do not like accidents, for the road is owned and operated by the government, and heads would be likely to fly off if anything happened through carelessness. The oscillation when the first passenger train went over was so great that some of its occupants became uneasy. Herbert Brewster, a New Yorker who made the initial trip, said that he went out on the platform of the rear car and found the chief engineer of the road standing by with a life belt in his hand, but no accident occurred. This was fortunate, as there were no more life belts on the train.

There is a daily express train from Hankow to Peking, and vice versa, which makes the journey in three days. Passengers have to eat their meals and sleep each night in Chinese inns, with primitive accommodations. In addition to the express service there is a train de luxe composed of sleeping and dining cars, which performs the journey in 36 hours, for which there is a supplementary charge of \$13 gold beyond the \$20 ordinary fare. It leaves Hankow at 11 p.m. on Saturdays, arrives in Peking at 11 a.m. Mondays, and returns at 11 p.m. Wednesdays, arriving at Hankow at 11 a.m. on Friday. Already this train has paid so well that a bi-weekly service will be run next season.

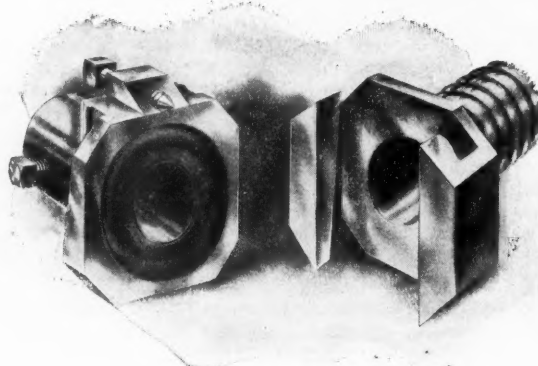
There are no arrangements for checking baggage in China, and the scene at Hankow on the open platform, dimly lighted with Chinese lanterns, just before the departure of the Peking train on Saturday night, puts an ordinary bridge crush in the shade. The Chinese have taken kindly to railroad travel and crowd every train, their enthusiasm being due in large measure to the number of free passes issued. As it is a government road, all officials of high and low degree are entitled to passes. Only foreigners and poor Chinese coolies appear to pay their fares. At stations three or four Chinese bands, composed chiefly of horns, cymbals and drums, mingle ear-

soothing strains with the voices of hundreds of Chinamen all talking at once. When a Mandarin travels on the train this performance is gone through at each stop made during the night as well as the day. Baggage is placed in a closed car and guarded by an armed Chinese watchman. As people are allowed to board the car at each station, and haul out any package they may want, it is just as well to give the watchman a quarter and indicate one's own baggage. The government warns all travelers that it takes no risk.

The sleeping cars on the train de luxe are similar to those in use in Europe, and are divided into two and four berth compartments. Chinese boys make up the berths, and an Italian conductor has charge of the train. Chinamen fill the diner all day long, eat and drink everything in sight, then smoke their long pipes filled with some soul destroying weed while the American passengers eat their meals. Frantic demands that the Chinamen should be made to smoke in the baggage car fall unheeded on the ears of the conductor of the diner. He is a guileless heathen Chinese. The strong odor of garlic and decayed seaweed mingled with the smoke of the quaint Chinese tobacco makes a subtle perfume, and puts one next to the people at once, as a Boston man described it.—*New York Times*.

#### The "American" Tender Hose Coupling.

The "American" tender hose coupling shown herewith is a gravity coupling, based on the wedge principle, a single straight movement only being required in coupling and uncoupling, without the



The "American" Tender Hose Coupling.

aid of any tool. It is claimed that it is perfectly tight at all times, automatically adjusts itself to changes in temperature, and vibrations tend to tighten it; that it does not leak under the most severe conditions. It is guaranteed to carry water or oil between engine and tender without waste. It is durable and there is little or no wear, except on the gaskets. The couplings are made to fit 2½-in., 3-in. and 3½-in. hose. They are in use on a number of roads. The American Coupling Co., St. Louis, Mo., is the maker.

#### Roadbed of Salt for the Western Pacific.

At a point about 120 miles west of Salt Lake City on the new line of the Western Pacific is a great area of salt beds eight miles wide and 40 miles long. Immediately west of Salt Lake City, the line of the road skirts the southern end of the Great Salt lake, crossing it at one point for a distance of six miles. At milepost 80 it enters the Great American Desert and for the next stretch of nearly 40 miles crosses a vast sea of alkali, gleaming in dazzling whiteness in all directions. Near the western end of the desert lie the salt beds where the previous whiteness of the landscape changes to a glaring sparkle of the salt crystals. So closely are these crystals packed together that they form a strong roadbed for the railroad. In building the line this hard level surface required no ballasting and no blasting; track-laying was a simple and rapid operation. In placing telegraph poles, however, it was necessary to blast out the salt, whose rock-like hardness made it impossible to dig down the required eight feet. This distance of eight feet for the telegraph poles is the deepest bore which has so far been made in the deposit, so that its true depth is not yet known. With no greater depth than this the commercial value of this salt deposit, which is said to be 95 per cent. pure, is very large. There is a theory that this deposit drains underground to the Great Salt lake. This is borne out by the fact that salt beds are 27 ft. higher than the lake, with the slope toward the lake. More than this, the salt deposit contains moisture, for ties and telegraph poles imbedded in it become moist to a point four or five inches above the surface. This also argues

an underground stream since the air is too dry to furnish enough moisture for this. Placer claims are already staked out on the salt beds.

#### New Scale of Wages on Bavarian Railroads.

In Baden also new scales of wages have been introduced. Those men who are paid for 365 days in the year are divided in four groups, according to the locality where they work, and in the year when they begin work are to receive 3 marks, 2.90, 2.80 and 2.70 marks a day, with an extra allowance of 10 per cent. for those employed in Mannheim. Three marks is 71.4 cents. Heretofore there were five classes, beginning to work at 2.20, 2.30, 2.40, 2.50, 2.60 and 2.70 marks, respectively. Those who are paid only for the days they work receive 10 pfennig a day more. An addition of 10 pfennigs a day is made after the first, the second, the fourth, the sixth, the ninth and the twelfth year. Thus the man who begins to work at 3 marks a day after 12 years' service will receive 3.60 marks (85.7 cents) a day. This is interesting to us, chiefly as an example of gradation of wages according to the varying living expenses in different parts of a small country.

#### The Atchison's Recreation Houses.

My work is to assume in every man on our road such qualities of honor and cultivation that no one of them ventures to fall below par. I work on the theory that a man has a strong tendency to become what he is assumed to be. Accordingly, I assume that every man is a gentleman, a man of honor, a man of reading and education. And I have had the gratifying experience of seeing thousands of men palpably bettered.

The Santa Fe has established a system of reading rooms, circulating libraries and club houses from end to end of the road, and I receive daily reports from each of the 25 reading rooms, each of the seven club houses, and from the circulating libraries. We charge a nominal fee for the privileges of the clubs. One of the finest features of the system is the fact that it is established for the whole families of the employees. That is a great factor in promoting domestic happiness. There are few divorces among our employees. We have the women as well as the men enjoying the benefits of the billiard table and the bowling alleys. We have the women reading in the reading rooms. We have the men and their wives at their own firesides reading the good books from the circulating libraries. The system, while not as yet absolutely self-supporting, can be made so very soon without any hardship to the men.—S. E. Busser, Superintendent of Department.

#### Disastrous Collision in France.

In a collision between a passenger train and a freight train at Contrats, France, August 24, 12 persons were killed and 31 injured.

#### Empire Bridge Company's Improvements.

The improvements to the Elmira, N. Y., plant of the Empire Bridge Company, Pittsburgh, Pa., have been under way since early in 1907, and it is expected that the enlarged plant will be in full operation before the end of the year. The completed plant will cover about 15 acres. It is served by the Erie, the Delaware, Lackawanna & Western and the Pennsylvania. Heretofore there has been but one building, 90 ft. x 100 ft.; the improvements consist of an extension to the original building, which will be the main bridge shop, making it 215 ft. x 528 ft.; a boiler and power house, a machine shop, a templet shop and a forge shop. All buildings are of steel construction, column bearing, with brick curtain walls, concrete foundations, and slate or slag roofs.

The present plant employs about 250 men and has an annual output of about 15,000 tons of steel bridge and building work. The enlarged establishment will require more than twice as many and the output will be quadrupled. Electric power, 220 volts, direct current, will be used throughout for individual motor drive and lighting. About two miles of standard gage railroad is being laid in yards and side tracks; cars are handled by a 40-ton switching locomotive owned by the company. About two miles of narrow gage track is being laid throughout the plant for conveying material. Two 100-ton track scales, one at the receiving end of the shop and the other at the finishing end, will record the weight of all carloads of raw material received and of finished product shipped out. The water supply comes from wells, and a water purifying system has been installed. Fire protection is afforded by a complete and independent system of piping with a high capacity pump kept under steam and ready for immediate use at all times. An emergency hospital will be maintained on the premises.

The boiler house is 42 ft. x 90 ft. There are four 250 h.p. water

tube boilers, equipped with mechanical stokers, damper regulators and feed water regulators, and fed by two compound duplex pumps, each of which can supply all boilers. The power house is part of the same building; it is 80 ft. x 60 ft., and contains two 300 k.w. generators, driven by horizontal tandem compound condensing engines, and one 100 k.w. generator of the same type, driven by a vertical cross compound condensing engine. There are two air compressors whose total capacity is 3,600 cu. ft. per minute, and other minor engines. The power house is spanned by a 20-ton electric crane. The machine shop building is 60 ft. x 240 ft. Planers, slotters, boring mills, heavy lathes and other machines for heavy work will be in the main aisle, which is 30 ft. wide and is served by a 15-ton crane running the length of the shop, while machine tools for lighter work will occupy the 15-ft. wings on either side, served by traveling jib cranes of special design. The forge shop, 60 ft. x 240 ft., will be used in part for making bolts, nuts and rivets, and the rest for bending, forging, tempering and making loop rods and light eye-bars. The templet shop will be 50 ft. x 224 ft. The main bridge shop is 215 ft. x 528 ft. In this building will be the tools for making main members of bridges and buildings of the heaviest type. There will be a system of 10-ton and 20-ton cranes overhead for general service, while all small machines will be served by special jib cranes. An extension 55 ft. x 80 ft. at the west end of the main shop will give space for detail material. The receiving yard and the shipping yard are each served by two electric traveling cranes on separate runways 600 ft. long. The combined storage area of these two yards is about 225,000 sq. ft., all of which is covered by skids to protect the material from rust by contact with the ground.

The Empire Bridge Company is a subsidiary of the American Bridge Company, New York.

#### Long Runs on English Passenger Trains.

The number of regular passenger trains now running on British railroads every week day which make trips of 100 miles or more without stopping is 156. This is shown by a list which has just been made up from the July time-tables. The total is slightly less than last year. Moreover, some of the trains have been made a trifle slower than formerly. Between London and Sheffield there are now only two such trains as compared with five a year or two since. Of the 156 trains in this year's list, 49 are on the London & North-Western, 32 on the Great Western, 25 on the Great Northern, 14 on the Midland, 10 on the North Eastern, seven on the Great Eastern, five on the Great Central, four on the London & South Western and 10 on the Caledonian. The last named is the only one of these roads outside of England. As regards speeds, the Great Western still stands at the head, six of the seven runs scheduled at 57 miles an hour or faster being on that road. The best speed of all is that made by the Great Western between London and Bristol by way of Bath, 118½ miles in two hours, 59.2 miles an hour.

#### Chicago Pneumatic Tool Company.

The income account of the Chicago Pneumatic Tool Company for the half year ended June 30, 1907, is as follows:

Profits for the half year .....	\$507,528
Depreciation of buildings, plant and machinery including repairs and renewals of buildings and plant .....	\$97,834
For developing and perfecting new tools .....	10,800
	108,634
Net profit .....	\$398,894
Reserve for bond interest .....	\$57,500
Sinking fund reserve .....	25,000
	82,500
Available for dividends .....	\$316,394
Quarterly dividends, Nos. 17 and 18 .....	125,576
Surplus for half year .....	\$190,818
Surplus brought from 1906 .....	878,410
Surplus carried forward .....	\$1,069,228

#### Chicago Subway.

Samuel McRoberts, the new President of the Illinois Tunnel Company, announces that by November 1 the subway will probably be carrying daily to and from railroad freighthouses of the city 10,000 carloads of freight of two or three tons each. The tunnel railroads—18 east and west and 12 north and south—connect with the freighthouses of the 23 railroads centering in the city. Mr. McRoberts has lately made freight contracts with all of these roads. The tunnel lines already have connections with a number of important stores and the expected new business will, no doubt, be from these stores to the freighthouses and vice versa, as well as from one freighthouse to another. The tunnel motors already make 1,000 trips a day with United States mails between the post office and railroad stations, and in the last three months has carried 2,516,



430 pouches, of which 99.97 per cent. were delivered on time. The tunnel company has, on its 2-ft. gage tracks, 1,200 cars and 80 electric motors; and 50 more motors will soon be received.

#### Hours of Labor on English Railroads.

The British Board of Trade has issued another report showing for a single month (April, 1907) the number of railroad employees in the United Kingdom who were on duty more than 12 hours at a time or who, after being on duty more than 12 hours, were allowed to resume work with less than nine hours' rest. The total number of trainmen and signalmen on the roads reporting is 109,257. These men worked, during the month of April, 2,639,851 days; and 46,201 persons were, on one or more occasions, on duty more than 12 hours at a time. The total number of instances of overwork was 87,431, or only about 3.3 per cent. of the total days' work. Most of the roads send supplementary statements showing that after deducting the hours in which the men do no work, although they are nominally on duty, a more favorable showing is made. The railroad companies have been notified that hereafter the Board of Trade will ask for a statement of this kind for one month in every quarter.

#### TRADE CATALOGUES.

*The San Luis Valley of Colorado.*—The Denver & Rio Grande has issued a folder describing the live stock and agricultural resources of the great San Luis valley in the southern central part of the state of Colorado, which embraces an area of over 3,000,000 acres of arable lands, as great an area as the state of Connecticut. The most profitable industry is hog raising, which has been given a great boom by the discovery of the value of the field pea as a feeding crop. The great advantage of this plant is that it is rich in nitrogen, which is valuable both as food for stock and as an enrichment of the soil. Grain fields worn out by continual recropping in wheat are being rejuvenated by planting them with field peas, whose roots store nitrogen from the air. Pea-fed mutton and pork sells for more than the same grain-fed products. The San Luis valley is also famous for its grain. Furthermore, the greatest yield of potatoes on a measured acre of ground ever recorded, 794 bushels, was raised in the valley in 1902, in competition for a prize offered by the *American Farmer*. The soil is well suited for sugar beets, but as yet no sugar factories have been established. The valley extends north and south 100 miles and east and west at the widest part 40 miles, and is surrounded on every side except the south by high mountain ranges. Its elevation is from 7,500 to 8,000 ft. above the level of the sea, yet it is the most level stretch of land of its size in the state of Colorado. The mountain ranges cut off severe storms, so that the climate is exceptionally good.

*Virginia Hot Springs.*—The passenger department of the Chesapeake & Ohio has issued an exceedingly attractive small booklet of convenient size (5 in. by 3½ in.) describing the attractions and advantages of Virginia Hot Springs as an all the year round pleasure and health resort. The booklet is an unusual example of taste in advertising. Both front and back covers are decorated in colors, the front cover bearing simply the words Virginia Hot Springs and the back cover Dr. Johnson's familiar quotation, "There is nothing by which so much happiness is produced as by a good tavern or inn." The full page illustrations are 3½ in. by 2 in. and there are many smaller photographs, yet these are so successful and well chosen that the book is more intelligently illustrated than many a larger volume. There are views of the "Homestead," the Virginia Hot Springs hotel, and of its surrounding buildings and attractions. The various baths and springs and their effects on various physical troubles are described. There are also a number of photographs of interesting scenery on the Chesapeake & Ohio.

*Metal Specialties.*—The William Powell Company, Cincinnati, Ohio, has issued a complete catalogue of its brass and iron specialties for engines and boilers. The catalogue gives all the necessary dimensions of each article and explains in detail its merits. The company's products include: Valves, lubricators, oil cups, injectors, gages, whistles and similar fittings. The catalogue includes a series of tables and rules which are useful to engineers and shop managers.

#### MANUFACTURING AND BUSINESS.

J. I. Boggs has resigned from the Virginia Bridge & Iron Co., Roanoke, Va., to become Contracting Engineer of the Southwestern Bridge Co., Joplin, Mo. Mr. Boggs' headquarters will be at Dallas, Tex.

The American Railways Company, Philadelphia, Pa., has secured property in Dayton, Ohio, on which to build new car barns and repair shops for the Peoples Railway, a subsidiary. Dodge &

Day, Philadelphia, have been commissioned to draw up plans for the buildings.

The Buffalo, Rochester & Pittsburgh is to extend its Clarion Junction shops this fall and also put some new machinery in the Dubois and Rochester shops.

The Central of Georgia has ordered from the Savannah Blow Pipe Co., Savannah, Ga., a blow pipe and heating and ventilating system for the new shops being built at Macon. The Savannah Blow Pipe Co. also has a contract for equipping the new shop being built for the Atlantic Coast Line at Waycross.

A. P. Eckert, heretofore with the Safety Insulated Wire & Cable Company, is now General Sales Manager of the Duplex Metals Company, 208 Fifth avenue, New York City. The Duplex Metals Company makes the Monnot "copper-clad" wire, samples of which were recently exhibited and described at a meeting of the Railway Signal Association.

E. H. Symington, Manager of Western Sales of the T. H. Symington Co., Baltimore, Md., who was thrown from his horse and seriously injured a few months ago, suffering from a fractured skull, is steadily improving and leaves this week on an extended trip around the world, including Japan, China, India and other Oriental countries. Mr. Symington hopes to be able to get back to work at his office in Chicago by the first of the year.

The London County Council recently received bids for two 7,500 h.p., three-phase steam turbo-generating sets to be installed in the new Greenwich power plant for the electric lines under construction in and near London. The lowest bid, £37,872 (\$189,360) was made by the British Westinghouse Electric & Manufacturing Co. The Parsons Steam Turbine Co. bid £40,502 (\$202,510), while the highest figure was £49,090 (\$245,450). The whole plant will cost over £1,000,000 (\$5,000,000).

The A. Gilbert & Sons Brass Foundry Co., St. Louis, Mo., makers of Velox bronze and other bearing metals, is building a new plant on Forrest Park boulevard between Vandeventer and Sarah streets, on a plot 75 ft. x 180 ft. The building will be a one-story structure, with a two-story front, the second floor to be used for offices. The roof will be of the saw-tooth pattern, with 18,000 sq. ft. of skylight. It will be supported on iron beams, leaving the ground floor clear of pillars. The new plant will cost in all about \$25,000, and is expected to be in operation by October 1.

The United States Consul General at Marseilles, France, has made a report on the conditions under which American manufacturers can hope to sell their products to French railroads. He says there is much red tape in the purchasing departments of French railroads and advises that manufacturers study the French market in person. He suggests that non-competing firms should form combined sales agencies and he has sent a list, which is now on file at the Bureau of Manufactures at Washington, of people and firms in France who might be willing to handle railroad equipment.

*Compressed Air* is no longer published by the Kobbe Company, New York, but by the Compressed Air Magazine Company, Bowling Green building, New York. W. L. Saunders, M. Am. Soc. C. E., remains editor, and Frank Richards has succeeded W. R. Hulbert, M.E., Assoc. Am. Soc. M. E., as managing editor. Mr. Richards, who is author of the book, "Compressed Air," was for ten years one of the editors of the *American Machinist*; before that he was for some time Superintendent of Shops of the Ingersoll-Sergeant Drill Company. Lucius I. Wightman is Manager of the new publishing company.

The resignation of Mansfield Merriman as Professor of Civil Engineering in Lehigh University takes effect on September 1. Hereafter his time will be largely devoted to practice as a consulting engineer, his office being at 45 Broadway, New York. The vacancy caused by his resignation has been filled by the appointment of Frank P. McKibben, as Professor of Civil Engineering, and of Winter L. Wilson as Professor of Railroad Engineering, the former having been for several years an assistant professor at the Massachusetts Institute of Technology and the latter an assistant professor at Lehigh University.

F. B. Maltby, who has been Principal Assistant Engineer on the Panama Canal, has resigned to become Chief Engineer of Dodge & Day, Philadelphia, Pa. Mr. Maltby is a graduate of the University of Illinois, class of 1882, and in 1907 received an honorary degree from the same institution. He has had long experience in railroad construction work, municipal engineering and irrigation work, and been at various times on the Wisconsin Central, the Missouri Pacific, the Chicago Great Western and the Illinois Central. He has had charge, for the United States Government, of all the dredging in the lower Mississippi river, and he designed and built the lock and movable dam on the Osage river in Missouri for the Government. He has been on the Panama canal for the last two and a half years, having had charge of railroad construction, docks and wharves,



shops, dredging and some buildings in Panama. He was in charge of the preliminary plans and construction of the Gatun lock and dam.

### Iron and Steel.

The Northern Central has ordered 2,000 tons of bridge steel.

The Panama Railroad is in the market for 3,000 tons of 90-lb. rails.

The Baltimore & Ohio is reported to have made reservations for rails for 1908 delivery.

The Norfolk & Western is reported to have made reservations for rails for 1908 delivery.

Orders for rails for 1908 delivery are said to aggregate less than for several years past at this season.

The Atchison, Topeka & Santa Fe is reported to have ordered 15,000 tons of 85-lb. rails for delivery as soon as possible from the Minnequa works of the Colorado Fuel & Iron Co., at Pueblo, Col.

The new open hearth rail mill of the Bethlehem Steel Company, South Bethlehem, Pa., was to be in operation by the end of this month. The structural steel plant, it is expected, will be ready toward the end of the year.

The Pittsburg Steel Company has ordered a 42-in. blooming mill from the Macintosh-Hemphill Company to be installed at the new Monessen plant. Additional ground has been bought, and it is said that other mills will be built.

According to press despatches, the Braddock and Homestead plants of the Carnegie Steel Company, Pittsburg, Pa., have put on extra crews of men to rush orders for rails and structural material for Japan, aggregating about \$2,000,000.

The Isthmian Canal Commission has ordered from the Maryland Steel Company 3,000 tons of 75-lb. rails, with accessories, to be used in Panama in connection with the canal construction work. The company, it is said, agrees to furnish the rails for \$95,250, shipment to be made in September; as compared with the bid of the United States Steel Corporation of \$97,350 for November shipment.

### OBITUARY NOTICES.

In speaking of the death of Israel Munson Spellman in the *Railroad Gazette* of August 16th, it was said that he was President of the Boston & Maine for 30 years, from 1839 to 1869. This was a mistake. Mr. Spellman was President of that company for only two years, from 1863 to 1865.

### MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad conventions and engineering societies, see advertising page 24.)

#### Association of Railway Superintendents of Bridges and Buildings.

At the seventeenth annual convention of this association to be held at the Republican House, Milwaukee, Wis., October 15-17, committee reports will be presented on the following subjects:

Concrete Bridges, Arches and Subways, W. H. Finley (C. & N.-W.), Chairman.

Concrete Building Construction, A. O. Cunningham (Wabash), Chairman.

Expansion and Contraction of Concrete Walls, A. S. Markley (C. & E. I.), Chairman.

Action of Sea Water on Concrete, Grosvenor Aldrich (N. Y., N. H. & H.), Chairman.

Use of Wooden and Asbestos Smoke Jacks for Engine Houses, J. H. Cummin (Long Island), Chairman.

Lock for Rolling and Sliding Doors on Freight Houses, C. A. Lichty (C. & N.-W.), Chairman.

Towers and Guides for Lights on Drawbridges, John N. Penwell (L. E. & W.), Chairman.

Protecting Steel Bridges Against Action of Salt Brine from Refrigerator Cars, R. P. Mills (N. Y. C. & H. R.), Chairman.

Pile and Frame Trestle Bridges, W. E. Smith (C. & M. & St. P.), Chairman.

Water Supply, C. E. Thomas (Illinois Central), Chairman.

Fire Protection, Wm. C. Carmichael (C. & R. I. & P.), Chairman.

Fences, Road Crossings and Cattle Guards, W. M. Noon (D. S. S. & A.), Chairman.

Preservatives for Wood and Metal, J. F. Parker (Southern California Ry.), Chairman.

### ELECTIONS AND APPOINTMENTS.

#### Executive, Financial and Legal Officers.

*Georgia State Railroad Commission.*—Gayton McLendon has been appointed a member of the Commission to serve the remainder of the term of Joseph M. Brown.

*Wisconsin State Railroad Commission.*—Professor B. H. Meyer has been elected Chairman, succeeding John Barnes, resigned. J. H. Roemer succeeds Mr. Barnes as a Member of the Commission.

#### Operating Officers.

*Baltimore & Ohio.*—C. F. Tompkins, general yardmaster at Chicago Junction, has been appointed Inspector of Yards, succeeding J. H. Rosenstock, resigned to go to another railroad company.

*Buffalo & Susquehanna.*—F. W. Allen, who was recently appointed Superintendent of the Buffalo division, began railroad work in April, 1897, as a rodman on the Erie. On July 1 he was transferred to the maintenance of way department on the Buffalo division. In October, 1901, he was appointed clerk in the general manager's office at New York in the maintenance of way and construction department. In 1902 he was appointed Division Engineer of the Wyoming and Jefferson divisions, and the next year was made Division Engineer of the Allegheny division. This position he resigned on August 1, 1904, to become roadmaster of the Cascade division of the Great Northern. In 1905 he was appointed Assistant Superintendent of the Minot division of that road, where he remained until going to the Buffalo & Susquehanna to take his present position.

*Hidalgo & Northeastern.*—See Mexican International.

*Mexican International.*—F. A. Lattig, Superintendent of the Hidalgo & Northeastern, has been appointed Superintendent of the Northeastern division of the Mexican International, with office at Monclova, Coahuila, succeeding R. J. Schmalhausen, resigned to become General Manager of the Bolivian Central.

*St. Louis & San Francisco.*—J. E. Hutchison, Superintendent at Fort Scott, Kan., has been appointed General Superintendent of the First district, with office at Springfield, Mo., succeeding J. H. Young, resigned to go to the Southern Pacific.

*Southern Pacific.*—Oscar Giffen has been appointed Car Accountant of the Pacific system, with office at San Francisco, Cal., succeeding R. A. Barker, resigned.

#### Traffic Officers.

*Duluth, South Shore & Atlantic.*—S. R. Lewis, chief clerk in the General Freight department, has been appointed Assistant General Freight Agent of this road and of the Mineral Range, effective September 1.

*Mexican Central.*—Charles F. Berna, commercial agent at El Paso, Tex., has been appointed to the new office of General Agent at that place, and his former office has been abolished.

*Mineral Range.*—See Duluth, South Shore & Atlantic.

*New York, Chicago & St. Louis.*—James Webster, General Freight Agent, has been appointed to the new office of Traffic Manager, effective September 1.

#### Engineering and Rolling Stock Officers.

*Chicago & North-Western.*—The headquarters of F. W. Peterson, Master Mechanic at Fond du Lac, Wis., have been moved to Green Bay, effective September 1.

*Chicago, Rock Island & Pacific.*—See Denver & Rio Grande.

*Denver & Rio Grande.*—F. E. Fox, Master Mechanic of the Chicago, Rock Island & Pacific at Goodland, Kan., has been appointed Master Mechanic of the First division of the Denver & Rio Grande, with office at Burnham, Denver, Colo., effective September 1.

*Hocking Valley.*—Mendell A. Kinney, who was recently appointed Master Mechanic, with office at Columbus, Ohio, was born in 1871 at Conneaut, Ohio. After a high school education he began railroad work in 1889 as an apprentice in the New York, Chicago & St. Louis shops at that place. He was made air-brake inspector in 1893 and later went to the Chicago shops as pit foreman and machine foreman. He was made general foreman at Fort Wayne, Ind., in 1903 and the next year went to the Baltimore & Ohio as general roundhouse foreman at Newark, Ohio. Last April he went to the Hocking Valley as general foreman of the South shops at Columbus, Ohio, where he remained until his recent promotion.

*Mexican Central*.—J. M. Fulton, Master Mechanic at Chihuahua, has been appointed Master Mechanic of the Aguascalientes division, succeeding W. O. Morton, resigned. R. A. Johnson succeeds Mr. Fulton.

#### LOCOMOTIVE BUILDING.

*The Ragley Lumber Company* has ordered one locomotive from the Hicks Locomotive & Car Works.

*The Parkersburg Mill Company*, Parkersburg, W. Va., is understood to be in the market for one 36-ft. gage locomotive to weigh 10 or 12 tons.

*The Northwestern Pacific*, as reported in the *Railroad Gazette* of August 16, is about to order two eight-wheel locomotives and four 10-wheel locomotives.

*The Lehigh Valley*, it is said, has ordered 10 locomotives from the American Locomotive Company, and 15 locomotives from the Baldwin Locomotive Works.

*The Chicago-New York Electric Air Line*, Chicago, is in the market for one locomotive for construction work, and is figuring on buying an additional locomotive.

*The New South Wales Government Railways*, as reported in the *Railroad Gazette* of May 24, have ordered 15 ten-wheel passenger locomotives, 10 tank locomotives and 30 consolidation locomotives from Beyer, Peacock & Co., Gorton Foundry, Manchester, England. Bids on this equipment were asked from builders in Great Britain, America, Europe and Australia.

*The Atchison, Topeka & Santa Fe*, as reported in the *Railroad Gazette* of August 23, has ordered from the Baldwin Locomotive Works 10 consolidation locomotives, weighing about 180,000 lbs. on drivers; two Pacific locomotives, with about 150,000 lbs. on drivers, and 23 switch engines, with about 144,000 lbs. on drivers. The consolidation engines will be equipped with Baldwin superheaters. All engines are duplicates of previous orders.

*The Newburgh & South Shore*, as reported in the *Railroad Gazette* of August 23, has ordered two simple six-wheel switching locomotives from the Baldwin Locomotive Works, for March, 1908, delivery.

#### General Dimensions.

Type .....	Switching
Weight, total .....	137,000 lbs.
Diameter of drivers .....	52 in.
Cylinders .....	20 in. x 26 in.
Boiler, type .....	Straight top
" working steam pressure .....	170 lbs.
Tubes, number .....	290
" maker .....	National Tube Co.
" length .....	10 ft. 11 in.
Firebox, length .....	108 in.
Firebox, width .....	35 "
Grate area .....	25 sq. ft.
Heating surface, total .....	About 1,803 "
Tank capacity .....	4,500 gals.
Coal capacity .....	9 tons
Special Equipment.	
Air brakes .....	Westinghouse
Bell-ringer .....	Gollmar
Couplers .....	Climax
Injector .....	Sellers
Piston and valve-rod packings .....	Twentieth Century Metallic
Sanding devices .....	Leach
Sight-feed lubricators .....	Detroit
Tires, driving wheel .....	Latrobe

#### CAR BUILDING.

*The Southern Pacific* is understood to be asking prices on 50 cabooses.

*The Lehigh & New England* is said to be in the market for 700 freight cars.

*The New Orleans Great Northern* is in the market for 700 freight cars.

*The Maine Central* has ordered two postal cars from the Pullman Company.

*The Pacific Coast Company* is said to be in the market for passenger equipment.

*The American Steel & Wire Company*, Chicago, is reported in the market for 300 freight cars.

*The Chicago & Illinois Midland* has ordered six flat cars from the Hicks Locomotive & Car Works.

*The Dayton & Troy Union* has ordered eight side-dump cars from the Hicks Locomotive & Car Works.

*The Boston & Maine* has ordered 1,008 steel underframe box cars from the Western Steel Car & Foundry Company.

*Wells Fargo & Co.* have not yet decided to buy 10 refrigerator cars, as reported in the *Railroad Gazette* of August 23.

*The North Georgia Marble Co.*, Ellijay, Ga., is said to be in the market for three or four side-dump cars for hauling ore.

*The Western Maryland* is said to be in the market for 1,000 cars, including 500 coal cars. A similar report last month was denied.

*The Crossett Lumber Company* has ordered two coaches, four box cars and three flat cars from the Hicks Locomotive & Car Works.

*The Cold Blast Transportation Company*, Chicago, has been receiving quotations on some tank cars, but nothing definite has been decided.

*Eyre-Shoemaker, Incorporated*, contractors, Philadelphia, Pa., has ordered eight second-hand furniture cars from the Hicks Locomotive & Car Works.

*The Antrim Iron Co.*, Mancelona, Mich., is in the market for from 15 to 20 standard gage second-hand flat cars of from 80,000 lbs. to 100,000 lbs. capacity.

*The Erie* did not at any time cancel the order for 3,000 box cars placed last February, as reported in the *Railroad Gazette* of August 16. Delivery of these cars is expected to begin in October.

*The Northwestern Elevated*, Chicago, as reported in the *Railroad Gazette* of August 2, has ordered 40 semi-convertible cars from the American Car & Foundry Co. The body of each car, with fixtures, will weigh 23,700 lbs., and the cars will measure 44 ft. 1½ in. long, 7 ft. 9 in. wide and 8 ft. 7 in. high, inside measurements. The special equipment includes:

Brake-shoes .....	Love Brake-Shoe Co.
Brakes .....	Westinghouse
Brasses .....	Northwestern Elevated standard
Curtain fixtures .....	Curtain Supply Co.
Curtain material .....	Pantasote
Journal boxes .....	Northwestern Elevated standard
Paint .....	Northwestern Elevated standard
Wheels .....	Standard Steel Works

#### RAILROAD STRUCTURES.

BURLINGTON, IOWA.—The Chicago, Rock Island & Pacific, it is said, is back of a project to build a bridge over the Mississippi river to be used by the railroad and by electric car lines, and also as a highway. Application is to be made to Congress.

FLUSHING, N. Y.—The New York & Queens County announces that it has plans ready for putting up car barns and repair shops on land recently bought, fronting Jackson avenue. The cost of the proposed improvements will be about \$250,000.

GREENVILLE, PA.—Additions and improvements, it is said, are to be made by the Bessemer & Lake Erie to its shops here at a cost of about \$350,000.

HOMESTEAD, PA.—Preliminary plans are reported made by the Pittsburgh & Lake Erie for putting up a new passenger station here to cost about \$25,000.

NISBET, PA.—The Pennsylvania has bids in for building a seven-span steel truss bridge to be 1,128 ft. long and 30 ft. above the water over the Susquehanna river to replace the present structure. The piers are to be built to carry two tracks, but the steel superstructure for the present will be single track. The contract is to be let as soon as permission to build the structure from the Water Commissioner of Pennsylvania has been granted. An order for 2,000 tons of bridge material was recently let by the Pennsylvania to the American Bridge Company.

PHILADELPHIA, PA.—Bids are wanted, September 11, by the Philadelphia Department of Public Works for the construction of bridges over the Pennsylvania Railroad at Belmont and Girard avenues and 31st street and Columbia avenue, and for two bridges along the line of the Torresdale boulevard. The bridge at Belmont avenue will cost about \$85,000, of which the railroad will pay \$20,000. The estimate for the 31st street bridge is \$52,500, the expense to be divided equally between the railroad, the Rapid Transit Company and the city. The Boulevard bridge over Little Tacony creek will cost about \$100,000, while the cost of the other bridge to span the Reading tracks is estimated at \$45,000. Bids are also asked for a number of main and branch sewers, the estimated cost of which will be \$220,000.

PITTSBURG, PA.—Announcement is made that the Wabash will soon ask for a franchise to build a bridge over West Carson street, in the west end, for the West Side Belt Line.

PORTSMOUTH, OHIO.—The Norfolk & Western, it is said, has bought 75 acres of ground for extensions to its shops at this place. In the enlarged shops 4,000 men will be employed.

POTTSVILLE, PA.—The borough officers of Mt. Carbon are considering the question of building a bridge from Cape Horn west over the electric car tracks, the old canal, the river and the Philadelphia & Reading tracks and abandoning the road near the Pennsylvania Railroad yards at Mt. Carbon. It is said that the Pennsylvania Railroad will pay for the improvements in return for the land granted.

## RAILROAD CONSTRUCTION.

## New Incorporations, Surveys, Etc.

**ATCHISON, TOPEKA & SANTA FE.**—Work is under way putting in 85-lb. rails on this road, between Pueblo, Colo., and Atchison, Kan.

**BEAUMONT & GREAT NORTHERN.**—This road, in operation from Trinity, Tex., on the International & Great Northern southeast to Onalaska, 20 miles, is being extended southeast to Beaumont, 95 miles from Trinity. The extension is expected to be finished to Livingston, 15 miles, next November, when contracts for a 50-mile section are to be let. It is said that the line when built is to be turned over to the International & Great Northern.

**BRITISH COLUMBIA (ELECTRIC).**—This company has plans under way for building a branch from New Westminster, B. C., southeast to Cloverdale, 30 miles. R. H. Sperling, General Manager, Vancouver, B. C.

**BROOKVILLE & MAHONING.**—See Pittsburg, Shawmut & Northern.

**CALIENTE & PIOCHE.**—See San Pedro, Los Angeles & Salt Lake.

**CANADIAN PACIFIC.**—General Superintendent Robert Marpole, of the Pacific division, is reported as saying that surveys for the extension of the Esquimalt & Nanaimo from Nanaimo, B. C., west to Alberni, 50 miles, are sufficiently advanced to permit construction work to be begun.

**CENTRAL OF GEORGIA.**—The work of installing passing tracks at all of the stations between Atlanta and Macon is about finished. Over 30 miles of new side tracks have been laid and counting the double track of eight miles from Atlanta to Hapeville the road has 38 miles of double track. It is understood that as soon as the new shops at Macon are finished, work will be begun on double-tracking the entire line between Macon and Atlanta. All of the recent work has been done by the company's men instead of by contractors.

**CHICAGO & ALTON.**—See Toledo, St. Louis & Western.

**CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.**—This company is buying right of way at Eau Claire, Wis., preparatory to building another section of double track.

**CLEVELAND, ALLIANCE & MAHONING (ELECTRIC).**—Contracts, it is said, are shortly to be let for building a section of this proposed line from Ravenna, Ohio, east to Newton Falls, 18 miles. (Mar. 15, p. 382.)

**COLORADO SOUTHERN, NEW ORLEANS & PACIFIC.**—See St. Louis & San Francisco.

**DANVILLE & SCOTTSVILLE.**—This company was incorporated about two years ago in Kentucky. It is now said to have about \$2,000,000 subscribed and to have begun actual construction at Scottsville. The proposed route is from Danville, Ky., southwest via Moreland, Hustonville and Liberty to Scottsville, 100 miles. At a recent meeting of the directors, J. S. Allen, of New York, was elected President, and E. P. Combast, of New York, Vice-President. M. J. Farris, President of the Citizens Bank, is Treasurer, and A. E. Hundley, Secretary, both of Danville. (March 15, p. 382.)

**DULUTH, RAINY LAKE & WINNIPEG.**—The bridge over Rainy lake is to be finished and through service begun September 1, on the extension of the Duluth, Virginia & Rainy Lake to the Canadian boundary at Rainier, where connection is to be made with the Canadian Northern. The road now extends from Virginia, Minn., north 93 miles. It is said that the company now proposes to build the line from Virginia south to Duluth, about 65 miles. (March 15, p. 383.)

**DULUTH, VIRGINIA & RAINY LAKE.**—See Duluth, Rainy Lake & Winnipeg.

**ESQUIMALT & NANAIMO.**—See Canadian Pacific.

**INDIAN CREEK VALLEY.**—Announcement is made that regular passenger trains have begun running on this road, recently finished from Indian Creek, Pa., northeast five miles to Normalville. It is also said that an extension is to be built from Normalville northeast to Ligonier, 25 miles. The road was built chiefly for the business of the McFarland Lumber Company, which has options on coal land north of Normalville and the proposed extension is to be built to develop this property.

**INTERURBAN CONSTRUCTION COMPANY.**—A franchise has been granted to this company to build a line from Denver, Colo., north to Greeley, 50 miles. The route of the proposed road is parallel to the Union Pacific for most of the way. Work must be started within six months, and be finished within two years. E. N. Reaser, President, Denver.

**KANSAS TRACTION COMPANY.**—Surveys are being made and rights of way secured for this proposed electric line to be built from Coffeyville, Kan., northeast via Lawrence and Topeka to Kansas City, Mo., 200 miles. Contracts are to be let for the work in November. It

will be low grade, mostly heavy, with 50 miles medium construction. F. B. Shirley, President, Coffeyville.

**LAKE ERIE, ALLIANCE & WHEELING.**—See Lake Shore & Michigan Southern.

**LAKE ERIE & YOUNGSTOWN (ELECTRIC).**—This company, incorporated to build an electric line from Conneaut, Ohio, south to Youngstown, about 60 miles, has all the rights of way secured and will shortly begin the work. Plans have been made for the entrance of the line into Youngstown, where connection is to be made with the Youngstown & Southern, which has been built to Columbiana, and is to be extended to East Liverpool, on the Ohio river, 100 miles from Conneaut. (April 12, p. 531.)

**LAKE SHORE & MICHIGAN SOUTHERN.**—Surveys, it is said, are under way for an extension of the Lake Erie, Alliance & Wheeling from its southern terminus at Piney Fork, in Jefferson county, Ohio, southeast to Martin's Ferry, 21 miles.

**MEXICAN MILLING & TRANSPORTATION COMPANY.**—This company has been authorized to build railroads in the municipalities of Guanajuato and La Paz, connecting with the Mexican Central near Santa Rosa, and a number of branches, a total of about 50 miles. The line must be located within three months, six miles built within 15 months and a similar amount finished each year, the entire work not to take over five years. An agreement has been entered into by the Department of Communications and Public Works and George W. Bryant to build the line.

**MEXICAN PACIFIC.**—A concession was recently granted to this company to build a branch in the state of Guerrero from Acapulco northwest via Ple de la Cuesta to a point on the Coyuca river, about 30 miles. According to the terms of the concession, location surveys must be begun within six months, three miles of the road must be built the first year, and the entire line finished within four years. The office of the company will be at Acapulco.

**MICHIGAN ROADS.**—A new logging road, it is reported, will be built by the Sawyer-Goodman Company in Mastodon township, Iron county, about 15 miles long. The proposed line is to penetrate a large tract of timber owned by the Sawyer-Goodman Company.

**MIDCONTINENTAL TRACTION.**—This company, recently organized by eastern capitalists to build an electric line from Tulsa, Ind. T., via Red Fork and Sapulpa, to the Glen Pool oil fields, about 21 miles, has completed financial arrangements and will shortly begin work. F. L. Smart, Kansas City, Mo., President; J. R. Burnham, Chief Engineer, Tulsa.

**MIDLAND VALLEY.**—The branch from Jenks, Ind. T., to Glen Pool, 6½ miles, has been opened for passenger service. (July 26, p. 111.)

**MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.**—An amendment to its charter has been filed by this company in Wisconsin, permitting it to build a branch from Brooton, Minn., northwest, 180 miles, to Superior.

**MISSISSIPPI VALLEY (ELECTRIC).**—Contract is reported let by this company to the Federal Construction Company of New York, to build its proposed electric line from Fort Madison, Iowa, south, via Keokuk, and thence east via Hamilton, Ill., to Carthage, Ill., 45 miles. Rights of way have been secured and capital, it is said, necessary to build the line has been obtained.

**OCEAN SHORE (ELECTRIC).**—The San Joaquin Valley Western, incorporated to build an extension of this road from Santa Cruz, Cal., east via Holister, is said to have located the line and secured the right of way for about 100 miles. Work will shortly be begun. The line when finished, including branches, is to be 220 miles long and to cost about \$6,000,000. (March 15, p. 388.)

**PENNSYLVANIA.**—This company, it is said, has opened its Pittsburg, Brownsville & Monongahela Railroad, a new branch from Brownsville, Pa., to Rice's Landing, 15 miles.

**PENNSYLVANIA ROADS (ELECTRIC).**—The Mercer Construction Co. has been granted a charter in West Virginia with \$25,000 capital to build an electric line from Mercer, Pa., northwest to Greenville, 15 miles. It is also proposed to build an extension from Greenville southwest to Sharpsville, 11 miles, where connection is to be made with the Sharon & Sharpsville. The proposed extension is to form part of a line to connect Erie with Pittsburg. The incorporators include J. M. Campbell, L. W. Orr and T. P. Filer, of Mercer; W. Hilderbrand, of Pittsburg, and S. D. Downs, of Greenville.

**PITTSBURG, SHAWMUT & NORTHERN.**—The Brookville & Mahoning, building from Hydes, Pa., southwest towards Pittsburg, to Freeport, 101 miles, for which contracts were let to the Miller Construction Company, of Lockhaven, has filed with the State Department of Pennsylvania a report of an increase of \$500,000 in capital stock. The company was authorized some time ago to increase its capitalization from \$1,350,000 to \$10,000,000. (March 15, p. 390.)

**ST. LOUIS & SAN FRANCISCO.**—The Colorado Southern, New Orleans & Pacific has been formally leased to this company. The division from Houston east, it is said, is to be opened for traffic



September 15 to De Quincy, and possibly as far east as Opelousas. The remainder of the line east to New Orleans is to be ready for operation about January 1. (July 26, p. 111.)

**SAN FRANCISCO, IDAHO & MONTANA.**—This company, which was incorporated to build a line from Butte, Mont., southwest to San Francisco, according to a reported statement of E. R. Place, General Manager, has bought all the necessary right of way, with the exception of 12 miles near Winnemucca, Nev., for the branch from Caldwell, Idaho, to Winnemucca, Nev., 196 miles. As yet we have not heard of any contracts being let except for 16 miles from Caldwell to Homedale. Donald Grant, President, Faribault, Minn.; I. H. Richardson, Chief Engineer, Caldwell, Idaho. (March 15, p. 391.)

**SAN JOAQUIN VALLEY WESTERN.**—See Ocean Shore.

**SAN PEDRO, LOS ANGELES & SALT LAKE.**—Freight and passenger service on the Caliente & Pioche, it is reported, has been established for 15 miles north of Caliente about half way to Pioche. (March 15, p. 380.)

**SOUTH DAKOTA CENTRAL.**—This company, building an extension from Rutland, S. Dak., north 75 miles to Watertown, has been finished to Nunda, six miles; the work has been delayed on account of lack of laborers. A large grading outfit has recently been put at work and the grading will be finished to Watertown by December. Work is now under way near Arlington, where the Chicago & North-Western tracks will be crossed. (May 10, p. 663.)

**SOUTH DAKOTA ROADS.**—The promoters of the proposed line from Mitchell, S. Dak., northeast to Marshall, Minn., about 130 miles, recently held a meeting at Mitchell and appointed a committee to exploit the project. L. L. Ness, D. B. Miller, O. E. Cassem, of Mitchell; J. Wadden, J. Larkin, C. B. Kenned, of Madison; L. P. Johnson, R. F. Schulz, of Ivanhoe; G. West, E. Olson, F. Sherwin, of Brookings; C. L. Johnson, L. A. Larson, G. P. Skortum, of Hendricks; I. J. Todd, of Salem; W. S. Dotym, of Epiphany; C. W. Shirley, of Clarno, and A. Swanson, of Winnifred, are on the committee. The proposed line is intended eventually to be extended from Mitchell, southwest to the Missouri river at Wheeler, giving the south central part of South Dakota a more direct connection with Minneapolis and St. Paul.

**SOUTHERN WISCONSIN (ELECTRIC).**—This company, formerly the Madison Street Railway Company, has petitioned the Wisconsin State Railroad Commission for a certificate of authority to build an interurban line from Madison southeast via MacFarland to Janesville, 40 miles. The Madison council about a year ago refused to grant the company a 40-year franchise for this purpose.

**STEPHENSVILLE NORTH & SOUTH TEXAS.**—This company was organized to build a line from Stephenville, in Erath county, Tex., south to Hamilton, 35 miles. It has been finished to Alexander, about 13 miles, and this section is said to be now open for traffic. The company expects to have the entire line to Hamilton finished about the middle of October. Read & Montgomery, Stephenville, contractors; McK. Johnstone, Chief Engineer. (Mar. 15, p. 388.)

**TOLEDO, ST. LOUIS & WESTERN.**—This road having acquired control of the Chicago & Alton, a connection is to be built from Panama, Ill., west to Litchfield, the eastern terminus of a Chicago & Alton branch, seven miles. By construction of this seven-mile link the two roads will together have a through route from Detroit and Toledo on the east to Kansas City on the west.

**WAGNER, LAKE SHORE & ARMOUR TRACTION.**—An officer writes that this company, which expects to let contracts in July for building its proposed electric line from Wagner, S. Dak., north via Lake Shore, Armour and Hillside to Mitchell, 65 miles, has been unable to carry out its plans by reason of its failure to secure satisfactory franchises in the city of Mitchell. Work has been under way for some time on the power plants at Armour and Platte, and these are now being rapidly finished. (May 31, p. 760.)

**WISCONSIN MIDLAND.**—A franchise has been granted this company, which has a capital of \$30,000, to build a line from the Chicago & North-Western at Chester, Wis., northwest, five miles, to Waupun. The line is eventually to be extended south from Waupun to a point beyond Beaver Dam. Thomas Mercein, of Milwaukee, is the principal promoter.

#### RAILROAD CORPORATION NEWS.

**BEAUMONT, SOUR LAKE & WESTERN.**—See St. Louis & San Francisco.

**CENTRAL OF GEORGIA.**—The directors have passed the dividend on the \$4,000,000 third preference income bonds. The usual dividend of 5 per cent. was declared on the first income bonds, but only 3.729 per cent. on the second incomes. For the last four years 5 per cent. has been paid on the first income bonds; the rate was 3 per cent. in 1902, 5 per cent. in 1901, 3¼ per cent. in 1900 and 2 per cent. in 1899 and 1898. On the second incomes 5 per cent. has been paid for the last two years, 2 per cent. in

1904 and nothing previously; on the third incomes 5 per cent. has been paid for the last two years and nothing previously.

**CHICAGO & ALTON.**—See Toledo, St. Louis & Western.

**CHICAGO, MILWAUKEE & ST. PAUL.**—This company is about to begin the electrification of its line from Wilson avenue, Chicago, to Evanston, Ill., according to an ordinance of the city of Chicago. The Northwestern Elevated is to operate its cars over this line. The cost, estimated at \$1,000,000, as well as the revenue from the service, will be divided between the two companies. It is expected that operation will begin in three months.

**COLORADO SOUTHERN, NEW ORLEANS & PACIFIC.**—See St. Louis & San Francisco.

**ERIE.**—The Directors have decided to pay the regular semi-annual dividend of 2 per cent. on the \$47,892,400 first preferred and the annual dividend of 4 per cent. on the \$16,000,000 second preferred stock in warrants which will run for 10 years and bear 4 per cent. interest.

**GREAT NORTHERN.**—The first distribution of profits by the trustees of the Great Northern's iron ore property, leased to the United States Steel Corporation last fall, has been declared. It is \$1 a share, payable September 16. The interest in the property was divided into 1,500,000 shares, with no fixed par value, which were distributed, share for share, to holders of Great Northern stock. It was announced last fall that a distribution of profits would be made at least once a year. In making this first distribution, however, the trustees did not say whether the present rate would be maintained or changed.

**INTERBOROUGH-METROPOLITAN.**—See Metropolitan Street Railway.

**METROPOLITAN STREET RAILWAY.**—Movements have been started to form a protective committee of the stockholders of this company because it is feared that the 7 per cent. guaranteed dividend on the \$52,000,000 stock may be reduced or passed entirely. The property is leased to the New York City Railway, the rental being the dividend referred to, the payment of which is guaranteed by the Metropolitan Securities Company, which owns all the stock of the New York City Railway. The Metropolitan Securities Company is controlled by the Interborough-Metropolitan Company. It is understood that the Metropolitan Street Railway has not been earning enough to cover the dividend and that the Metropolitan Securities Company has been making up the deficit. The last named company, however, has no apparent source of income other than what it gets from the stock of the New York City Railway. The Interborough-Metropolitan, it is said, has decided not to pay unearned dividends on the Metropolitan Street Railway stock if the Metropolitan Securities Company is not able to do so.

**NORTHWESTERN ELEVATED.**—See Chicago, Milwaukee & St. Paul.

**ROCK ISLAND COMPANY.**—See Toledo, St. Louis & Western.

**ST. LOUIS & SAN FRANCISCO.**—The Colorado Southern, New Orleans & Pacific's property has been leased to the St. Louis & San Francisco. The road is under construction from Baton Rouge, La., to De Quincy, 138 miles; from De Quincy to Beaumont, Tex., 47 miles, the tracks of the Kansas City Southern are to be used and the Beaumont, Sour Lake & Western, which ran from Beaumont to Sour Lake, 22 miles, and was acquired some time ago by the St. Louis & San Francisco, has been rebuilt and extended to Houston. Connection is ultimately to be made between Baton Rouge and New Orleans.

**SOUTHERN.**—A semi-annual dividend of 1½ per cent. has been declared on the \$60,000,000 non-cumulative 5 per cent. preferred stock, payable October 17. The annual rate has been 5 per cent. since 1901, when it was 4 per cent. It was 3 per cent. in 1900, 2 per cent. in 1899, and 1 per cent. in 1898 and 1897. After reducing the dividend, the Directors announced that, though feeling that the unusual results of last year were not liable to be repeated, they believed it best to limit the distribution of profits until the permanent effects of high prices, increasing taxes and legislative reduction of earnings could be fairly measured.

**TOLEDO, ST. LOUIS & WESTERN.**—This company is to buy control of the Chicago & Alton from the Rock Island Company and interests associated with it. In return for \$6,380,000 preferred and \$14,420,000 common stock of the Chicago & Alton out of \$19,544,000 preferred and \$19,542,800 common outstanding, the Toledo, St. Louis & Western is to issue collateral trust bonds to be turned over to the Rock Island Company. For the preferred stock bought, 4 per cent. collateral trust bonds are to be issued at par and for the common stock collateral trust bonds are to be issued at 35, which are to bear interest at 2 per cent. for five years and then 4 per cent. For further comment on this purchase, see editorial column and also a short article with map published in this issue.